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ABSTRACT

The National Assessment of Vocational Education (NAVE) examined how the federal law was implemented and federal funds were distributed under the Carl D. Perkins Vocational Education Act of 1984. This part of the study described the access of handicapped and academically disadvantaged high school students to vocational education and analyzed the quality of the programs in which these students participate. Analyses that address student enrollment patterns were based on the 1987 High School Transcript study. Some of the findings of the study are the following: (1) both handicapped and academically disadvantaged students enrolled in public high schools do have access to vocational education, and, in fact, they earn more credits than other students; (2) handicapped and disadvantaged students took a higher percentage of their course work in area vocational centers than did other students; (3) handicapped and disadvantaged students earned 37 percent of the credits in cooperative education programs as compared to 43 percent for advantaged students; (4) handicapped females earned considerably fewer credits in occupationally specific courses than any other group of students; and (5) students in schools with large concentrations of poor and low-achieving youth took fewer vocational courses than students in other schools. Recommendations were made for improving handicapped and disadvantaged students' access to high quality vocational programs and to cooperative education, for providing placement services, and for targeting funds to schools with high percentages of special needs students. (KC)

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FINAL REPORT
Volume V

HANDICAPPED AND DISADVANTAGED STUDENTS: ACCESS TO QUALITY VOCATIONAL EDUCATION

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NAVE

NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION
UNITED STATES DEPARTMENT OF EDUCATION

HANDICAPPED AND DISADVANTAGED STUDENTS: ACCESS TO QUALITY VOCATIONAL EDUCATION

Becky Jon Hayward
John G. Wirt

National Assessment of Vocational Education

August 1989

This document reflects the views of the National Assessment of Vocational Education. It does not necessarily represent the views of the U.S. Department of Education.

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We would like to express our gratitude to the persons who provided assistance and support during our work for the National Assessment of Vocational Education. First, Dorothy Shuler, the NAVE project monitor for much of this work, provided consistently thoughtful guidance during all phases of our work for the NAVE. Her retirement from government service, though well deserved, is a loss to all of us who have over the years benefited from her wisdom and insights concerning the nation's vocational education enterprise.

Other NAVE staff who contributed to the work that resulted in this report were Robert Meyer, who has made an important contribution to research in vocational education through his development of the Secondary School Taxonomy (SST), a framework for analyzing vocational enrollment patterns that we have followed in this report; and Lana Muraskin, who investigated many of the same issues from a different perspective in her work on the implementation of the Perkins Act.

Other government officials who were extensively involved in the 1987 High School Transcript Study were extremely generous with their advice as we developed our analyses of the course enrollment patterns of special needs students that are based primarily on that source. These included Andy Kolstad, National Center for Education Statistics, who was the project monitor for the Transcript Study; and Susan Thompson-Hoffman, Office of Special Education Programs, who shared her expertise in educational issues relevant to students enrolled in special education.

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Finally, the members of our study's expert panel were extremely generous in offering suggestions at key points during the work. These persons included Dennis Mithaug, Allen Phelps, Darrell Parks, Cynthia Parsons, Don Foellner, and Bill Malloy.

Becky Jon Hayward

PREFACE

The National Assessment of Vocational Education (NAVE) was mandated by Congress in the Carl D. Perkins Act of 1984 (Section 403[a]). The mandate calls for "descriptions and evaluations" of the vocational education services delivered to special populations, the effects of the Act in modernizing the vocational education system, the impact of vocational education on academic skills and employment opportunities, and other topics.

The final report from the National Assessment consists of five volumes.

Volume I: *Summary of Findings and Recommendations* summarizes the main findings and conclusions of the National Assessment.

Volume II: *Implementation of the Perkins Act* examines how the federal law was implemented and federal funds were distributed and used under the Perkins legislation.

Volume III: *Secondary Vocational Education* analyzes high school vocational education enrollments, academic achievement and employment outcomes, and recommends federal policy.

Volume IV: *Postsecondary Vocational Education* analyzes postsecondary vocational education enrollments, employment outcomes, issues of finance in relation to federal support for vocational education, and recommends federal policy.

Volume V: *Handicapped and Disadvantaged Students--Access to Quality Vocational Education* describes and analyzes the participation of handicapped and disadvantaged students in vocational education.

These reports were based on a series of studies commissioned by the NAVE. Copies of the NAVE reports and a list of all the contractor reports can be obtained by contacting: NAVE-Room 3141, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC, 20202.

A distinguished panel of experts met four times to advise the National Assessment and review drafts of the interim and final reports. The members of the panel, who gave generously of their time and sound advice, were: Charles Benson (University of California, Berkeley), Sue E. Berryman (Teachers College, Columbia University), James Campbell (MISSCO Corporation), Edwin Herr (Pennsylvania State University), Dorothy Horrell (Red Rocks Community College), James Kadamus (State Department of Education, New York), Willis McCleod (Petersburg Public Schools), Milbrey McLaughlin (Stanford University), Daniel Morley (State Street Bank and Trust Company), William Morrill (Math Tech, Inc.), Lawrence Palmer (Cornell University), Robert Scot (North Carolina System of Community Colleges), and David Wise (Harvard University).

NAVE staff began to implement the National Assessment in January 1987, after the study plan was reviewed by congressional staff members in both the House and Senate education committees. The key staff members were Lana Muraskin, David Goodwin, Robert Meyer, and Dorothy Shuler. Specific acknowledgments of all staff and contractor contributions to the final reports are contained in each of the reports.

The National Assessment of Vocational Education was generously supported by the Office of Planning, Budget, and Evaluation of the Department of Education. Key officials of the Office and the Department granted NAVE staff both the funds required and the independence necessary to carry out the study. Special gratitude is owed in this regard to Alan S. Ginsburg of the Planning and Evaluation Service and Thomas M. Corwin of the Budget Service.

However, all conclusions and recommendations of this report are strictly those of the National Assessment and do not necessarily represent views of the Department of Education.

John G. Wirt
Director, National Assessment
of Vocational Education

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EXECUTIVE SUMMARY

INTRODUCTION

Among the charges to the National Assessment of Vocational Education (NAVE) in conducting the congressionally mandated evaluation of programs and activities supported under the Carl D. Perkins Vocational Education Act of 1984 (P.L. 98-524) was the mandate to evaluate the access of special needs students to high-quality vocational programs. This report describes the access of handicapped and academically disadvantaged high school students to vocational education and analyzes the quality of the programs in which these students participate. Among the research questions addressed in the report are the following:

For handicapped students:

- Do handicapped students have access to the full range of vocational programs available to their nonhandicapped peers?
- Do handicapped students have access to high-quality vocational education?
- To what extent do demographic and other characteristics affect handicapped students' access to high-quality vocational education? Do these characteristics affect other students' enrollments in similar ways?

For academically disadvantaged students:

- What are the vocational enrollment patterns of disadvantaged high school students? Do these patterns differ from those of high-achieving students?
- Do academically disadvantaged students have access to high-quality vocational programs?
- In what ways do demographic characteristics affect the types of vocational programs in which disadvantaged students enroll? Do these characteristics affect the vocational enrollments of advantaged students in similar ways?
- To what extent do the vocational programs and course-taking options available to disadvantaged and advantaged students differ across schools?
- What are the implications of the findings for the targeting of federal resources?

Analyses that address student enrollment patterns are based on the 1987 High School Transcript Study (HSTS), which provides the first opportunity that researchers have had to investigate the course-taking behavior of handicapped high school students on a national level and to compare their educational experience with those of their nonhandicapped classmates. Included in these analyses are students in the HSTS sample who were in the 11th grade in school year 1985-86 and thus were generally members of the high school class of 1987. Examination of the influence of school characteristics on students' vocational enrollments is

based on the sophomore cohort of the High School and Beyond (HS&B) survey. Included in these analyses are students in the high school class of 1982 for whom high school transcripts were available.

SYNTHESIS OF STUDY FINDINGS

The report's principal findings concerning the access of special needs students to vocational education are summarized in the following sections. Included are a synthesis of findings on handicapped and academically disadvantaged students' access to high-quality vocational programs and a summary of our findings on the influence of school characteristics on the range and quality of vocational programs available to secondary students nationally.

Enrollments in Vocational Education

Analysis of HSTS transcripts show that both handicapped and academically disadvantaged students enrolled in public high schools do have access to vocational education; in fact, they earn more credits in vocational education than other students. Most of the vocational credits earned by handicapped students are in regular, as opposed to self-contained, vocational classrooms. This finding is encouraging given the objective of the Perkins Act and other federal legislation that handicapped students should be provided with access to vocational education in the "least restrictive environment."

- Handicapped students earned an average of 5.20 credits of vocational education, compared to 4.02 credits for nonhandicapped students over four years of high school. These credits amounted to 27 percent of the total credits earned by handicapped students, compared to 18.3 percent of the total credits earned by nonhandicapped students.

- Handicapped students took 81.7 percent of their vocational course work in regular, as opposed to self-contained, classrooms. In comparison, these students took only 59.5 percent of their academic course work in regular classrooms.

- Academically disadvantaged students earned an average of 4.39 credits of vocational education in high school (or 23.6 percent of their 18.6 total credits). Advantaged students earned 3.01 credits in vocational education (or 12.1 percent of their 24.87 total credits).

As heavy participants in vocational education, handicapped and disadvantaged students also took a higher percentage of their course work in area vocational centers than did other students. The proportion of courses taken in area vocational centers may be considered an indicator of the quality of programs in that these schools are generally thought to offer a wider range of higher quality, occupationally specific courses than comprehensive high schools.

- Handicapped students earned nearly twice as many of their vocational credits in area vocational schools as nonhandicapped students (16.0 percent versus 8.8 percent).

- Academically disadvantaged students earned 12.5 percent of their vocational credits in area vocational schools and advantaged students, 5.8 percent.

One reason that handicapped and disadvantaged students took a higher percentage of their vocational education at area vocational centers appears to be the larger amount of occupationally specific course work they took compared to other students. In general, the amount of vocational education taken by students at area vocational schools increases in proportion to the number of occupationally specific courses taken.

Another measure of the quality of students' vocational programs is the extent to which they have access to cooperative education and other forms of work-based courses. Studies of the employment experiences of handicapped students show that well-supervised employment experiences during high school, such as those provided through cooperative education, are important determinants of successful labor force entry and job retention. Although handicapped and disadvantaged students earned more credits, on average, in their work-based courses than did other students, the study found that no students earned many credits in work-based courses.

- Handicapped students earned 16.7 percent of their vocational credits in work-based courses (cooperative education, paid work experience, and work study) compared to 10 percent for other students.

- Disadvantaged students earned 10.1 percent of their vocational credits in work-based courses compared to 7.2 percent for advantaged students.

However, the quality of the work-based vocational education taken by handicapped students, as measured by the percentage of credits earned in cooperative education as opposed to paid work experience or work study, is lower than the quality of the work-based vocational education taken by other students.

- Fourteen percent of the credits in work-based courses earned by handicapped students were in cooperative education, compared to 44 percent for other students.

- Thirty-seven percent of the credits in work-based courses earned by disadvantaged students were earned in cooperative education, compared to 43 percent for advantaged students.

In contrast to the beliefs of many critics, neither handicapped nor academically disadvantaged students spent a great deal of time in training for jobs in low-level *service occupations* such as food service, cosmetology, building maintenance, and household services. Only about 12.6 percent of handicapped students' vocational credits and 13.6 percent of disadvantaged students' vocational credits were in these fields. By contrast, nonhandicapped students earned 9.9 percent of their vocational credits in training for low-skilled service occupations and academically advantaged students earned 9.6 percent.

The enrollment patterns of handicapped and disadvantaged students differed significantly by gender, however. Handicapped females, in particular, earned considerably fewer credits in occupationally specific courses than any other group of students, and they

lacked access to business and office occupations. Furthermore, handicapped female students were disproportionately enrolled in training for service occupations as well as nonoccupational vocational education when compared to both nonhandicapped females and all male students.

Nearly half of all vocational credits earned by handicapped females, and nearly half of the vocational credits of academically disadvantaged females, were in service occupation courses or consumer and home economics. In contrast, handicapped or academically disadvantaged males exhibited enrollment patterns resembling those of nonhandicapped and academically advantaged males. This finding suggests that male special needs students have greater occupational opportunities in vocational education than do female special needs students.

Access to High-Quality Vocational Education

Next we compared the quality of vocational education in *schools* with large concentrations of poor and low-achieving students to the quality of vocational programs in schools with large concentrations of advantaged students. Quality was defined in terms of the breadth and depth of courses offered. The measures of quality used were: whether students in the school had access to an area vocational center; whether the school offered cooperative education; the total number of vocational courses offered by the school; the total number of advanced, occupationally specific courses; and the number of program areas in which more than one or more than three courses were offered (business support and health, for example, are program areas).

We found major differences in the quality of vocational programs between schools with large and small concentrations of poor and academically disadvantaged students. Students in the most "disadvantaged" group of schools were 40 percent less likely than students in the most advantaged schools to have access to an area vocational school. Schools with the largest concentrations of disadvantaged students offered 40 percent fewer vocational courses than the most advantaged schools and about one-half as many advanced vocational courses. There were also a third fewer program areas in the most disadvantaged schools compared with the most advantaged schools.

Although their choices were constrained, the graduates of schools with the highest concentrations of disadvantaged students took a much larger proportion of their high school course work in vocational education than did students enrolled in schools with the lowest concentrations of disadvantaged students. Students in the most disadvantaged schools earned 12.06 credits in academic subjects and 6.49 credits in vocational education (or less than twice as many academic as vocational credits), compared to 16.26 credits in academic subjects and 3.26 credits in vocational subjects in the most advantaged schools (or nearly five times as many academic as vocational credits). This major difference indicates why the quality of vocational education (and its possible academic content) is critical to the quality of overall education for students in disadvantaged schools.

RECOMMENDATIONS

Based on these findings, we offer five recommendations for improving the vocational education programs and activities available to handicapped and disadvantaged secondary students who attend comprehensive high schools throughout the nation.

Strategies for Improving Handicapped and Disadvantaged Students' Access to High-Quality Vocational Programs

Our data suggest that problems experienced by female students in gaining access to high-quality vocational programs are exacerbated for handicapped and disadvantaged female students. That is, gender, in combination with special needs, has more deleterious effects on students' access than either handicapping condition or academic disadvantagement alone. Expansion of female handicapped and disadvantaged students' enrollments in nontraditional programs should be an explicit goal of federally funded school improvement grants targeted on schools with high concentrations of special needs students. Additionally, school performance on this issue should be included in any indicators developed by states for measuring achievement of local vocational education programs in improving the enrollments and outcomes of special needs vocational students.

Strategies for Increasing Special Needs Students' Access to Cooperative Education

Research on the school-to-work transition of handicapped and disadvantaged students has suggested that participation in cooperative education (or at least formal, credit-bearing paid work experience) during high school improves students' likelihood [illegible] obtaining competitive jobs after graduation. Our analyses of students' transcripts reveal [illegible]ver, that these programs are not widely available to special needs or other stu[illegible] secondary level. Research, possibly in the form of well-designed and rigorously [illegible]stration projects, is needed to determine the longer term effects of such p[illegible] labor force entry, retention, and advancement.

Implementation of Placement and Follow-Along Services for Handicapped Students

Research findings from the National Longitudinal Study of Handicapped Youth's Transition as well as elsewhere indicates the continuing existence of barriers to labor force entry for handicapped youth as well as for other youth as they exit high school. The emphasis on expanding placement activities for all students that appears in the NAVE secondary recommendations is particularly critical for handicapped students. Additionally, there is a major need for more accurate and comprehensive information on postschool employment outcomes of these students, which should be a specific focus of any performance indicator systems developed by states for measuring the achievement of local vocational education programs in improving the programs and outcomes of special needs students.

Targeting of Federal and State Resources on Schools With High Concentrations of Special Needs Students

The amount and quality of the vocational programs available to students attending poor (and small) schools is significantly lower than they are to students attending advantaged (and large) schools. In order to facilitate improvement of the vocational programs available to these students, federal and state vocational funds should be targeted on schools that contain high concentrations of special needs students.

Access to Area Vocational Schools

Although handicapped and disadvantaged students earn proportionately more of their vocational credits in area vocational schools than do nonhandicapped or academically advantaged students, their total enrollment in area schools is not high. To the extent that such schools offer a wider range of occupationally specific vocational programs than do comprehensive high schools, localities should ensure the availability of these programs to all special needs students, particularly to female and minority students whose enrollment at area vocational schools is considerably lower than that of white handicapped and disadvantaged male students.

CHAPTER 1

INTRODUCTION

OVERVIEW OF STUDY PURPOSES

Among the charges to the National Assessment of Vocational Education (NAVE) in conducting the congressionally mandated evaluation of programs and activities supported under the Carl D. Perkins Vocational Education Act of 1984 (P.L. 98-524) was the mandate to evaluate the access of special needs students to high-quality vocational programs, along with any special supportive services these students might need in order to succeed in those programs. As specified in NAVE's mandate, among the particular responsibilities of the assessment is to describe and evaluate:

> ". . .the vocational education activities and services delivered to the individuals who benefit from vocational education activities and services assisted under this Act, including the expansion of access to quality vocational education for individuals described in section 201(b) [including individuals with disabilities and persons who are academically or economically disadvantaged] and adults. . ." (section 403(a)(1).

The purpose of this report is to describe the access of handicapped and academically disadvantaged high school students to high-quality vocational programs. Among the research questions addressed in the report are the following:

For handicapped students:

- Do handicapped students have access to the full range of vocational programs available to their nonhandicapped peers?
- Do handicapped students have access to high-quality vocational education?
- To what extent do demographic and other characteristics affect handicapped students' access to high-quality vocational education? Do these characteristics affect other students' enrollments in similar ways?

For academically disadvantaged students:

- What are the enrollment patterns of disadvantaged high school students in vocational education? Do these patterns differ from the enrollments of advantaged students?
- Do academically disadvantaged students have access to high-quality vocational programs?

- In what ways to demographic characteristics, such as gender and race, affect the types of vocational programs in which disadvantaged students enroll? Do these characteristics affect the vocational enrollments of advantaged students in similar ways?

- To what extent do the vocational education programs and course-taking options available to advantaged and disadvantaged students differ across schools?

- What are the implications of the findings for the targeting of resources and activities to increase the access of disadvantaged high school students to high-quality vocational education?

Analysis of student enrollment patterns is based on the 1987 High School Transcript Study. This study provides the first opportunity that researchers, policymakers, and educators have had to investigate the course-taking behavior of handicapped high school students on a national level. Furthermore, the study represents the first time ever that comparison between the high school programs of handicapped and other students has been possible. Thus, the information available to address questions of access to secondary vocational education, differences in the types of academic and vocational courses in which handicapped and other students enroll, and the extent to which handicapped students receive their instruction in regular classes along with their nonhandicapped classmates provides an important resource for policymakers concerned about the equitable treatment of handicapped youth within the nation's educational system.

FEDERAL INVOLVEMENT IN TARGETING OF VOCATIONAL FUNDS

To provide a context for reviewing the information presented in this report on vocational enrollment patterns of handicapped and disadvantaged youth, in this section we provide a brief overview of federal involvement in targeting of vocational education funds to special needs students. Congressional intent to ensure that students with special needs have access to the full range of vocational education was first articulated in the Vocational Education Act of 1963. The Act included improvement of vocational education opportunities for persons with "academic, social, or other handicap that prevents them from succeeding in the regular vocational education program" as one of the six purposes for which Basic Grant

funds could be spent by the states.[1] Provisions for implementing this goal were weak, however, with discretion in establishing funding priorities among the six purposes left entirely to the states, and national progress on improving vocational education for special needs students was limited.

As a result, the 1968 and 1976 amendments to federal vocational education legislation re-emphasized congressional intent to improve access for these students. The 1968 amendments added an important new goal to the Basic Grant program of improving vocational education for physically handicapped students. Additionally, these amendments created two set-asides that required states to spend at least minimum amounts--15 percent for disadvantaged students and 10 percent for physically handicapped students--of their allocation on activities for special needs students.[2]

Prior to enactment of the 1976 amendments, Congress engaged in extensive debate on provisions to target resources to handicapped and disadvantaged students. Concern was expressed over whether states were spending the required 15 percent on improving disadvantaged students' access to vocational education. As a result, the 1976 amendments tightened the targeting provisions, thus expressing Congress' continuing interest in meeting the needs of these students. Additionally, the set-aside for disadvantaged students was increased to 20 percent of the Basic Grant funds. These amendments also included new provisions intended to ensure that the federal set-asides would act as a lever to increase state and local spending on the target groups.

The Perkins Act continued the trends of earlier legislation with regard to targeting of resources to students with special needs. The Act increased the disadvantaged set-aside to 22

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[1]A small amount of resources was also included to fund a program of research, training, and demonstration projects to meet the "vocational education needs of youths, particularly youth in economically depressed communities who have academic, socioeconomic, or other handicaps that prevent them from succeeding in regular vocational programs."

[2]Subsequent development of federal policies on handicapped children in the Education of All Handicapped Children Act (EHA), P.L. 94-142, as amended, and other legislation expanded the definition of eligible handicapping conditions to include cognitive and behavioral conditions as well.

percent, maintained the handicapped set-aside at 10 percent, and established additional set-asides for other special needs groups (particularly single parents and displaced homemakers). Congress also included new requirements on how states and districts should allocate federal funds along with state and local funding of programs for special needs students.

While this report does not focus specifically on funds allocation issues, it investigates the effects of congressional intent to ensure handicapped and disadvantaged students' access to high-quality vocational programs and services through a detailed examination of the vocational enrollment patterns of high school students. Thus, a key emphasis in the report is on two issues having to do with vocational enrollments: the question of whether special needs students overall have access to the same vocational programs available to other students; and the issue of whether the specific vocational courses in which these students enroll can be considered "high-quality" vocational education.

DATA SOURCES AND METHODOLOGY

The primary data source used to analyze the vocational enrollment patterns of handicapped and disadvantaged high school students was the 1987 High School Transcript Study (HSTS).[3] Analysis of the effects of school characteristics on the amount and quality of vocational education available to disadvantaged high school students that appears in chapter 3 is based on a subset of the sophomore cohort of the High School and Beyond (HS&B) survey. Because the HSTS has only recently become available for analysis and is not widely known to researchers, we provide a brief description of the study in this section. Additionally, we describe the framework used for analyzing vocational courses and programs.

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[3]The 1987 High School Transcript Study was conducted by Westat and Policy Studies Associates for the U.S. Department of Education, National Center for Education Statistics, under Contract number ED 300-87-0066. The National Assessment of Vocational Education was one of the study's primary sponsors. A detailed description of the study is available in Judy M. Thorne, et al., *Technical Report: 1987 High School Transcript Study* (Washington, DC: U.S. Department of Education, 1989).

High School Transcript Study

The HSTS collected the high school transcripts of 34,144 students, 6,585 of whom were handicapped, who attended comprehensive public or private high schools in the nation. Students in the sample were eligible for selection if they were 17 years of age, in the 11th grade, or both 17 and in the 11th grade in school year 1985-86. Thus, in general, these students represent the high school class of 1987.

The sample of schools for the HSTS comprised a nationally representative sample of 471 eligible secondary schools selected for the 1986 National Assessment of Educational Progress, Year 17, of which 433 schools participated in HSTS. The schools in the study are comprehensive public or private high schools. Thus, the HSTS sample does not include students attending such specialty schools as vocational high schools, special education schools, or area vocational schools that become a student's school of record. It does include students attending area vocational schools if their home comprehensive schools remain the school of record.

The coding system used to develop the transcript data file was the Classification of Secondary School Courses (CSSC), containing approximately 1,800 course codes. This system was revised and adapted to distinguish levels of courses, to expand the system's capacity to accommodate details of vocational education courses, and to classify and code special education courses. Each course appearing on a student's transcript was assigned a 7-digit code based on course content, level (e.g., on-grade level 11th grade English is distinguished from remedial or honors 11th grade English), and status as a regular or special education course. Course catalogs and other information were used to determine the content, level, and status of courses. Additional information coded for each course included grade and credit (in Carnegie units) received, and, for vocational courses, location of instruction. Student information included gender, grade level, age, exit status, and race/ethnicity. For special education students, additional information collected included handicapping condition; severity of cognitive,

psychosocial, and physical limitation; placement; and instructional level in reading and mathematics.

Student transcript data were weighted for the purpose of making nationwide estimates of course-taking by 1987 graduates and their classmates who failed to graduate on time. The final weight attached to an individual student record reflected two major aspects of the sample design and the population surveyed: the probability of selection in the sample and the nonresponse adjustment. Estimation of sampling errors was performed by an application of the jackknife procedure.

Analyses presented in this report are based on the subset of the HSTS sample that includes students whose eligibility for sample selection was that they were in the 11th grade at the time the sample was drawn in school year 1985-86 rather than on 1987 graduates only.[4] This subset provides a more sensitive basis for comparison of the course enrollment patterns of handicapped and nonhandicapped, and academically disadvantaged and advantaged, students. In the case of handicapped students, the 11th grade subset of students provides the best basis for comparison with nonhandicapped students in terms of their vocational programs in high school. Students in both groups would have been in high school approximately the same amount of time. Because most students take the majority of their vocational courses in grades 11 and 12, limiting the analyses to this group permits more accurate comparison of vocational course-taking in that students in both groups would have had an equivalent opportunity to enroll in vocational courses. In terms of disadvantaged students, use of the 11th grade subset provides a more accurate picture than would have been possible if the analyses had been limited to students who graduated from high school with their class in spring 1987, primarily because it permits us to capture the influence of these students' greater likelihood to drop out or not to complete their high school program on time.

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[4]It is important to remember that these students, because they were in the 11th grade in school year 1985-86, would have been *expected* to graduate in spring 1987. Their special educational needs, reflected in such behavior as slower educational progress or premature exit from school, affect their graduation rates.

High School and Beyond Survey

The data source used for the analysis of the effects of school characteristics on the quality of vocational programs and course enrollment options for students is the 1982 graduates in the HS&B. A subset of the 1980 sophomore cohort, comprising 6,600 students with transcripts in 770 public schools, was used for the analysis. This subset contains information on the background of students and the schools they attended. Student information includes achievement levels, based on students' performance on the HS&B tests of mathematics and verbal achievement; family income; and socioeconomic status (SES), a composite measure including parents' education, parents' occupation, and number of siblings in the family. School information used for the analyses includes school size, region of the country, availability of an area vocational school, and details on vocational offerings.

Framework for Analyzing Vocational Course-Taking

The framework used to classify CSSC course codes for analyzing students' vocational enrollment patterns is the *Secondary School Taxonomy* (SST), which was developed by NAVE.[5] The system organizes all secondary vocational course codes contained in the CSSC into types, subject areas, and levels. The three *types* of vocational courses are:

- Consumer and homemaking education, which includes courses in home management, cooking, sewing, and the like;
- General labor market preparation, including exploratory and introductory courses such as industrial arts, work-study, or vocational mathematics; and
- Specific labor market preparation, including courses in occupationally specific skill areas such as welding, electronic technology, communications, and other fields in which students prepare to enter the labor market or postsecondary training.

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[5]Cynthia Brown, Gareth E. Hoachlander, Robert H. Meyer, Antoinette Gifford, and John Tuma. *The Secondary School Taxonomy (SST)* (Berkeley, CA: MPR Associates, Inc., March 1989), p. 83. Additionally, the classification of special education courses is based on Becky J. Hayward, *Special Education Course Classification and Coding System*, NAVE Contractor Report (Washington, DC: Policy Studies Associates, 1987).

Within the category of specific labor market preparation are eight broad occupational subject areas, or fields. These eight *subjects* are:

- o Agriculture
- o Business and office occupations
- o Marketing
- o Health occupations
- o Occupational home economics
- o Trades and industry
- o Technical and communications occupations
- o Other, unspecified courses

Finally, also within the category of specific labor market preparation, the system permits analysis of the extent to which students pursue a program of vocational studies in each specific skill area through categorizing vocational courses by *levels*. Each occupationally specific vocational course is assigned to one of three levels:

- o First course in a sequence of courses in a specific skill area
- o Second or later (i.e., advanced) course in a sequence of such courses
- o Nonsequential course in a specific skill area

Overall, then, this framework for analyzing vocational enrollments at the high school level enables us to address the key questions concerning students' secondary vocational programs. It permits investigation of the extent to which students enroll in general or introductory vocational courses to the exclusion of occupationally specific classes. Further, it enables investigators to examine the extent to which students can be considered vocational *concentrators*--that is, whether they take an occupationally specific, sequenced program of vocational studies in high school that may improve their postgraduation options to obtain good entry-level jobs or pursue further training after high school. Finally, it provides information on the specific fields in which students matriculate, which, together with available research,

provides insights on whether those fields offer potential career ladders or are in areas traditionally characterized by relatively low-paying, dead-end jobs.

ORGANIZATION OF THE REPORT

Subsequent sections of this report present the results of our analyses of the vocational enrollment patterns of handicapped and disadvantaged students. In Chapter 2, we describe the participation of handicapped high school students in vocational education. Of particular interest are the extent to which these students participate in regular, as opposed to self-contained, vocational classes and the [illegible] in which they enroll. Chapter 3 describes the participation of disadvantaged students in vocational education at the high school level and presents an analysis of the influence of school characteristics on the opportunities available to these students. Chapter 4 contains a discussion of issues affecting secondary vocational education for these special [illegible].

CHAPTER 2

VOCATIONAL ENROLLMENT PATTERNS OF HANDICAPPED HIGH SCHOOL STUDENTS

The ongoing concern among federal policymakers that children and youth with disabilities achieve their full educational and labor force potential is reflected in statutory requirements governing both vocational and special education as well as in a number of federally supported programmatic initiatives throughout the nation. In response to a long history of exclusion of people with disabilities from participation in the mainstream of society, a specific objective of much federal activity, particularly the enactment of the Education of All Handicapped Children Act (EHA) in 1975, has been to ensure that disabled elementary and secondary students receive the special support they need to achieve as much independence as possible, given their individual goals and capabilities. The intent, in short, has been to change the tradition of relegating persons with disabilities to separate schools, self-contained classrooms, sheltered workshops, life in institutions, and other manifestations of our historical failure to recognize the right of all citizens to full membership in American society.

An important component of the federal intent to improve the options of disabled persons has been the emergence of congressional attention to the federal role in shaping vocational education policy as it relates to this group. Over the past two decades, Congress has targeted a share of federal vocational education resources to students with disabilities in an attempt to ensure their access to high-quality vocational preparation for productive participation in the labor force.

The Carl D. Perkins Vocational Education Act of 1984 (P.L. 98-524) continued this pattern of setting aside a portion of available funds to meet the special needs of handicapped students. The provisions of Section 204 of the act specify that handicapped persons, along with other persons with special needs, be assured full access to vocational education courses, programs, and activities. The act also stipulates that handicapped students' vocational programs be coordinated with services they receive under EHA. Among the services authorized in the

Perkins Act are assessment, special services required to facilitate students' success in their vocational courses, and counseling and related support to help students make the transition from school to work or postsecondary enrollment.

As part of the work performed to meet the congressional mandate calling for description and evaluation of programs and activities assisted under the Perkins Act, the National Assessment of Vocational Education (NAVE) commissioned studies to investigate the extent to which students with handicaps are receiving vocational education services according to Congress' intent. The purpose of this chapter is to present findings of studies that addressed the participation of handicapped secondary students in vocational education.[6] Key questions addressed include the following:

- Do handicapped secondary students have access to the full range of vocational programs available to their nonhandicapped peers?
- Do handicapped students have access to high-quality vocational education?
- To what extent do demographic and other characteristics affect handicapped students' access to high-quality vocational education? Do these characteristics affect other students' enrollments in similar ways?

To address these questions, we present a profile of handicapped secondary students that provides a context for reviewing the findings on access and quality, followed by a summary of our findings on access to vocational education and a discussion of the quality of the vocational programs and services in which handicapped high school students enroll. The 1987 High School Transcript Study (HSTS) provides the first opportunity that researchers, policymakers, and educators have had to investigate the course-taking behavior of handicapped high school students on a national level. Furthermore, HSTS represents the first time ever that comparison

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[6]Primary data sources used in the chapter include (1) the 1987 High School Transcript Study, which collected information on the secondary school course-taking behavior of a nationally representative sample of handicapped and nonhandicapped high school students; (2) Becky J. Hayward, *School-to-Work Transition: A Study of Model Programs for Handicapped Youth*, NAVE Contractor Report (Washington, DC: Policy Studies Associates, 1989); and (3) a review of research, which analyzed available studies that had investigated the relationship between high school handicapped students' educational programs and their postschool employment and educational experiences.

between the high school programs of handicapped and other students has been possible. Thus, the information available to address questions of access to secondary vocational education, differences in the types of academic and vocational courses in which handicapped and other students enroll, and the extent to which handicapped students enroll in mainstream courses--that is, receive their instruction in the regular instructional environment--provides an important resource for policymakers concerned about the equitable treatment of handicapped youth within the nation's educational system.

PROFILE OF HANDICAPPED SECONDARY STUDENTS[7]

The number of students receiving special education services has increased steadily since enactment of EHA in 1975, from 3.7 million in school year 1976-77 to 4.4 million in 1986-87.[8] According to data collected by the Office of Special Education Programs (OSEP) for school year 1986-87, at the high school level 7.1 percent of the nation's 16-year-olds, 6 percent of 17-year-olds, and 3.4 percent of 18-year-olds were receiving special education services in regular or special education settings.

The HSTS sample of handicapped students provides an estimate of the population of handicapped students in regular public high schools for the age and grade sampled. During school year 1985-86, 5.47 percent (nearly 235,000 students) of all 11th grade high school students in regular public high schools were enrolled in special education services. To provide a context for examining issues related to these students' participation in vocational education, we present a profile of this population in this section.

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[7]Our data show that the nation's regular private schools do not enroll handicapped students at the high school level. Thus all analyses presented in this chapter refer to handicapped students enrolled in public high schools.

[8]U.S. Department of Education, *Tenth Annual Report to Congress on the Implementation of the Education of the Handicapped Act* (Washington, DC: Office of Special Education Programs, 1988).

Nature and Severity of Students' Handicaps

Nearly two-thirds of the handicapped students in this age/grade were classified as learning disabled, while 21 percent were mentally retarded, and 8.5 percent were seriously emotionally disturbed (see table 2.1). The remainder had sensory, orthopedic, other health impairments, or multiple handicaps. According to special education teacher ratings, many of these students had moderate to severe cognitive or psychosocial limitations that were likely to slow their educational progress. Over 40 percent were moderately or severely cognitively limited, while 20 percent were moderately or severely psychosocially limited. Overall, only 11.4 percent of the students were judged to have no cognitive limitations, while nearly half (47.4 percent) had no psychosocial limitations.

Demographic Characteristics

The nation's handicapped high school students differed markedly from their nonhandicapped peers in race/ethnicity, gender, and age for grade. As shown in table 2.1, 66 percent of handicapped students in this age/grade group were white, while 25 percent were black, and 8 percent were Hispanic. Among nonhandicapped students, 72 percent were white, 15 percent black, and 8.5 percent Hispanic. Thus, handicapped students were considerably more likely to be black, and somewhat less likely to be white or Hispanic, than were other high school students.

Handicapped students were also considerably more likely than other students to be male (69.7 percent of handicapped students versus 51.2 percent of nonhandicapped students). In view of gender-based differences in vocational course-taking behavior (discussed later in this chapter), the fact that more than two-thirds of all handicapped students enrolled in high school were male has important implications for vocational education service delivery, particularly in the context of adapting or developing services necessary to facilitate students' success in their vocational programs.

Table 2.1

Characteristics of Handicapped High School Students
(Weighted totals)

Student Characteristic	Number	Percentage
Handicapping condition		
Learning disability	127,665	65.98%
Mental retardation	40,355	20.86
Serious emotional disturbance	16,477	8.52
All other conditions	9,005	4.65
Total	193,502	100.00
Cognitive limitation		
Severe	13,734	6.72
Moderate	69,087	33.81
Mild	98,209	48.06
Not affected	23,323	11.41
Total	204,353	100.00
Psychosocial limitation		
Severe	10,008	4.91
Moderate	30,817	15.13
Mild	66,321	32.56
Not affected	96,540	47.40
Total	203,686	100.00
Race/ethnicity		
White	148,704	65.71
Black	55,548	24.55
Hispanic	17,518	7.74
Other	4,525	2.00
Total	226,295	100.00
Gender		
Male	162,725	69.72
Female	70,689	30.28
Total	233,414	100.00

SOURCE: 1987 High School Transcript Study.

NOTES: Total numbers of students in each category of variables reported in this and later tables differ somewhat because of different amounts of missing data. There are more missing values for handicapping condition than for other variables because several states legally require that students not be classified according to the nature of their handicapping condition. The confidence intervals and significance levels of the data presented in this chapter are discussed in appendix A.

Finally, for a given grade level, handicapped high school students tended to be older than their nonhandicapped peers. As data reported in table 2.2 show, more than 83 percent of nonhandicapped students in the 11th grade were either 16 or 17 years old in school year 1985-86.[9] In comparison, only 45 percent of handicapped students were 16 or 17, while about the same proportion (44 percent) were 18 in the 11th grade, and 10 percent were 19 or older. These findings suggest that handicapped students had experienced grade retention earlier in their educational careers or took a longer time to complete high school. In general, though, our data show that relatively few students "aged out";[10] less than 2 percent of handicapped students were 20 years old or older.

Table 2.2

Distribution of Handicapped and Nonhandicapped Students by Age
(Weighted totals)

	Handicapped Students		Nonhandicapped Students	
Age	Number	Percentage	Number	Percentage
19 or older	16,027	10.36%	78,304	2.52%
18	68,208	44.08	436,732	14.05
17	63,447	41.00	2,231,040	71.75
16	6,652	4.30	359,035	11.55
Younger than 16	406	0.26	4,187	0.13
Total	154,740	100.00	3,109,298	100.00

SOURCE: 1987 High School Transcript Study.

[9]With the exception of data on student characteristics, most of the findings presented in this chapter are based on students who were in the 11th grade in 1985-86 when the sample was drawn. This 11th grade subset of students provides the best basis for comparison of handicapped and nonhandicapped students in terms of their vocational programs in high school. Students in both groups have been in high school approximately the same amount of time. Because most students take the majority of their vocational courses in grades 11 and 12, limiting our analyses to this group permits more accurate comparison of vocational course taking between handicapped and nonhandicapped students in that students in both groups would have had an equivalent opportunity to enroll in vocational courses.

[10]Under the provisions of EHA, students are entitled to receive special education services until the age of 21; in some states, the age limit is higher.

Educational Status

Basic Skills Achievement

As noted in table 2.1, nearly all the handicapped students enrolled in regular high schools had handicapping conditions--learning disabilities, mental retardation, or serious emotional disturbances--that impeded their educational progress. These students required a variety of special education support services to help them complete their high school programs. Information provided by special education teachers on students' reading and mathematics instructional levels suggests the nature of their educational needs (table 2.3). (This information is based on teachers' assessments of students' status, which may or may not include standardized test scores.)

Table 2.3

Reading and Mathematics Achievement Levels
of Handicapped High School Students
(Weighted totals)

Achievement Level	Reading		Mathematics	
	Number	Percentage	Number	Percentage
Undetermined	11,406	5.79%	14,604	7.43%
Grade 4 or lower	51,455	26.10	41,327	21.04
Grades 5-8	84,199	42.71	93,573	47.64
Grades 9-12	50,102	25.41	46,921	23.89
Total	197,162	100.00	196,425	100.00

SOURCE: 1987 High School Transcript Study.

Nearly 75 percent of the handicapped students were judged by special education teachers to be reading at less than a high school level, and more than 75 percent were performing in mathematics at less than a high school level. Twenty-six percent were reading at or below fourth-grade level, while more than 21 percent were at or below that level in

mathematics. Basic skills deficits pose several types of barriers to handicapped students' participation in vocational education. First, handicapped students may be excluded from courses that vocational educators believe require a relatively high level of basic skills achievement. For example, a number of vocational teachers interviewed during site visits to model school-to-work transition programs for handicapped students[11] reported that handicapped students were seldom permitted to enroll in business and office courses, because their basic skills deficits made failure in that program nearly certain.

Students can also be deterred by the reading level of instructional materials. One vocational-special education teacher commented on the difficulty her learning disabled students encountered in comprehending the material in their data processing textbook, which was written on the 12th grade level. To accommodate the needs of these students, the teacher acquired audiotape materials from the Lighthouse for the Blind.

Mainstreaming

A key question concerning handicapped students' high school programs is the extent to which the courses in which they enroll are separate--or self-contained--classes. As noted earlier, a major goal of federal education policy in the past decade has been to remove the barriers that handicapped persons have traditionally faced in their attempts to achieve educational and social integration, while ensuring that they receive the support services necessary to function successfully in the least restrictive environment appropriate to their goals and capabilities. As data reported in table 2.4 show, handicapped students were more likely to be mainstreamed in vocational courses than in their other high school course work. Nearly 82 percent of the vocational courses in which handicapped students enrolled were regular classes.[12] In comparison, less than 60 percent of their academic classes were mainstream; 75 percent of

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[11]Becky J. Hayward, op. cit.

[12]Because transcripts do not include information on support services, such as reduced student-teacher ratios, curriculum adaptations, or provision of aides or other tutorial help, it is not possible to report the extent to which students are receiving such services in their mainstream academic, vocational, or personal/other classes.

their personal/other (e.g., health and physical education, driver education) courses were mainstream classes. Overall, 68 percent of the credits earned by handicapped students attending regular high schools were in regular classes.

Table 2.4

Enrollment of Handicapped High School Students in Regular Courses, as a Percentage of Credits Earned

Course	Academic	Vocational	Personal/ Other	All Courses
Regular education	59.6%	81.7%	75.1%	67.9%
Special education	40.4	18.3	24.9	32.1
Percentage of all courses	58.0	26.6	15.4	100.0

SOURCE: 1987 High School Transcript Study.

Exit Status

The differential between handicapped and other high school students in educational progress is reflected in graduation and dropout rates. As the data reported in table 2.5 show, about 68 percent of handicapped students who were in the 11th grade in school year 1985-86 graduated in 1987. In comparison, 87 percent of their nonhandicapped peers graduated with their class.

In their last year of high school, more than twice as many handicapped as nonhandicapped students dropped out of school (10.4 versus 4.3 percent).[13] In addition, nearly 8 percent of handicapped students were still enrolled in school at the end of 1987; this group

[13]These data somewhat underestimate the actual percentage of dropouts, because the "other" category (which includes students whose status is unknown) almost certainly includes some dropouts. Thus, dropout rates among handicapped students in their senior year are likely to be even higher than the 10.4 percent for whom dropout status could be verified.

of students included some of the relatively small proportion of students in regular high schools who may eventually have "aged out" rather than graduated from school.

Table 2.5

Exit Status of Handicapped and Nonhandicapped Students

Exit Status	Handicapped Students	Nonhandicapped Students
Graduated	67.56%	86.99%
Received certificate of attendance	3.81	0.09
Were still enrolled	7.56	1.82
Dropped out	10.39	4.26
Other[a/]	10.69	6.83
Total	100.00	100.00

SOURCE: 1987 High School Transcript Study.

a/ Includes transferred, GED, and unknown.

In summary, 40 percent of handicapped high school students had moderate or severe cognitive limitations, and 20 percent had moderate or severe psychosocial limitations. Furthermore, handicapped students were disproportionately black and male, tended to be older for grade level than their nonhandicapped peers, and were less likely to graduate on time. On average, 68 percent of the credits they earned in high school were in regular classes, although handicapped students were more likely to be mainstreamed in vocational than in academic courses.

ACCESS TO VOCATIONAL EDUCATION

Analysis of the transcripts of handicapped students enrolled in comprehensive public high schools reveals that in general these students did have access to secondary vocational education. As data reported in table 2.6 show, 96 percent of all handicapped students earned at least some credits in vocational education in high school (as did 95 percent of other

Table 2.6

Participation in Vocational Education by Handicapped and Nonhandicapped High School Students

Credits earned in vocational courses	Handicapped Students	Nonhandicapped Students	Total
0	3.95%	4.68%	4.65%
0.01 - 0.50	3.14	5.64	5.52
0.51 - 1.00	4.54	8.96	8.75
1.01 - 2.00	9.88	15.79	15.51
2.01 - 3.00	11.31	13.85	13.73
3.01 - 4.00	11.55	12.28	12.24
4.01 - 5.00	11.85	10.41	10.48
5.01 - 6.00	10.51	8.66	8.75
More than 6.00	33.26	19.73	20.38
Total	100.00	100.00	100.00

SOURCE: 1987 High School Transcript Study.

students). In fact, overall handicapped students earned considerably more credits in vocational courses than other students did: 44 percent earned more than 5 credits, and over 33 percent earned more than 6. In contrast, only 28 percent of nonhandicapped students earned more than 5 credits, and less than 20 percent earned more than 6.

Vocational education also represented a greater share of the high school course work taken by handicapped students than it did for other students (table 2.7). First, handicapped students averaged a full credit more in vocational education than did other students. Furthermore, handicapped students who earned any credits in vocational education devoted, on average, nearly 27 percent of their high school program to vocational courses, while other students spent about 18 percent of their high school years in such courses. (As table 2.7

shows, handicapped students earned fewer credits overall in high school, and 4 credits less in academic subjects, than did nonhandicapped students.)

Table 2.7

Average Credits Earned in High School by Handicapped and Nonhandicapped Students

Course	Handicapped Students		Nonhandicapped Students	
	Average Credits	Percentage of All Credits	Average Credits	Percentage of All Credits
Academic	11.13	57.73%	15.26	69.36%
Vocational	5.20	26.97	4.03	18.32
Personal/other	2.95	15.30	2.71	12.32
All credits	19.28	100.00	22.00	100.00

SOURCE: 1987 High School Transcript Study.

Effects of Student Characteristics on Vocational Course-Taking

Student characteristics, including nature of handicapping condition, level of cognitive and psychosocial limitation, race/ethnicity, and gender, affected the amount of vocational education handicapped students took in high school (table 2.8). Mentally retarded students earned more credits in vocational education (an average of 5.6) than any other group of students. Nearly 30 percent of all credits they earned in high school were in vocational education. Students with severe cognitive or psychosocial limitations took relatively fewer vocational courses than those whose limitations were less severe. Those with severe cognitive limitations earned 4.33 credits in vocational education, while students without cognitive limitations earned 4.99 and those whose limitations were mild earned 5.45. Severely psychosocially limited students earned fewer average credits in vocational education (3.86) and

Table 2.8

Distribution of Credits Earned in Vocational Education by Handicapped Students, by Characteristics

Student Characteristic	Average Number of Credits in Vocational Education	Percentage of all Credits	Percentage of Credits Earned in Mainstream Classes
Handicapping condition			
Learning ability	5.32	27.10%	87.77%
Mental retardation	5.60	29.74	63.83
Serious emotional disturbance	4.61	25.91	79.23
All other conditions	4.80	23.65	75.65
Cognitive limitation			
Severe	4.63	25.04	63.31
Moderate	5.33	28.01	78.57
Mild	5.45	27.48	83.90
Not affected	4.99	26.46	91.89
Psychosocial limitation			
Severe	3.86	22.68	79.15
Moderate	4.68	25.69	69.72
Mild	5.50	28.35	77.45
Not affected	5.49	27.66	87.90
Race/ethnicity			
White	5.49	28.20	84.85
Black	4.56	24.95	72.86
Hispanic	4.59	24.03	70.51
Other	5.00	23.70	90.55
Gender			
Male	5.25	27.23	82.13
Female	5.14	26.52	80.64

SOURCE: 1987 High School Transcript Study.

spent less of their time (22.68 percent) in vocational education than did any other single group of special education students.

As shown earlier in table 2.4, nearly 82 percent of the vocational credits earned by handicapped high school students were in regular (mainstream) courses; this statistic suggests that, as a group, these students had achieved access to essentially the same vocational education that was available to others. As might be expected, however, the nature and severity of students' handicapping conditions limited the extent to which they enrolled in mainstream vocational courses (see table 2.8). Mentally retarded students earned fewer credits in mainstream classes (64 percent of their vocational courses) than handicapped students overall, while learning disabled students earned proportionately more of their vocational credits in mainstream classes (88 percent). Seriously emotionally disturbed students earned 79 percent of their vocational credits in mainstream classes; the comparable figure for students with other handicapping conditions was 76 percent.

White handicapped students earned the most credits in vocational education and black students earned the least. White handicapped students also devoted a somewhat greater share of their time to vocational education than did other handicapped students. In comparison, among nonhandicapped students, white students averaged somewhat fewer credits in vocational education than did black students (4.10 versus 4.19 credits),[14] with students of other ethnicities earning the fewest credits overall (3.24 average credits). For both handicapped and nonhandicapped students, Hispanic students and students of other ethnicities consistently spent a smaller share of their high school time in vocational courses. Male handicapped students earned slightly more credits in vocational education and spent a slightly larger share of their high school time in vocational programs than did females, a pattern that holds for nonhandicapped students as well.

The extent of mainstreaming also varied by ethnicity and gender. Students of "other" ethnicities (Asian, Native Americans, Alaskan native) earned the highest proportion of their vocational credits in mainstream classes (91 percent), while Hispanic students earned the lowest

[14]Not shown in table 2.8. Vocational credits accounted for a slightly larger share of the overall high school credits earned by black nonhandicapped students than white students (19.87 versus 18.40 percent).

(71 percent). Males were slightly more likely to enroll in mainstream classes than females (82 versus 81 percent).

Summary of Findings on Access

In summary, our data show that handicapped students attending regular public high schools in the latter half of the 1980s had achieved essentially the same amount of access to vocational education that other students experienced. In fact, on average they spent a greater share of their time in vocational education and earned more credits in these programs than other students. The extent to which students were admitted to mainstream vocational courses varied somewhat by handicapping condition as well as by severity of cognitive limitation, and the number of credits they earned varied with demographic and other student characteristics.

The transcript data provide some indication of access to, or at least differential choice regarding, vocational education. But it is important to consider the limitations of a study based on student transcripts, which yields comprehensive information on the courses students actually take in high school but tells nothing about the decisions on which their enrollment in, or access to, courses is based. For example, as already mentioned, mentally retarded students earned more credits in vocational education than any other group, but they were considerably less likely to enroll in mainstream vocational courses than students with other handicapping conditions. Thus, questions remain as to whether these students are routinely assigned to vocational rather than academic courses, whether these assignments are made according to individual student needs and capabilities, and whether assignment to seif-contained programs is based on individual student needs, as required by the provisions of EHA, or on some other consideration. These questions, like the question of why handicapped black students took less vocational education while other black students took more vocational courses than their white peers, require more intensive investigation of the bases of individual decisions about educational programs. This point is particularly important in any consideration of the programs of handicapped students, whose access to mainstream education has historically been limited.

QUALITY

Perhaps the most important issue concerning handicapped students' participation in secondary vocational education has to do with the *quality* of the relatively large amounts of vocational education they took. In other words, were these students being relegated to the food service and janitorial programs that appear to have been their typical placements in the past? If not, in what programs were they enrolling, and what inferences can be made about the quality of the education they are receiving in their vocational courses?

Although no information on posthigh school experiences is available for students in HSTS to serve as an indicator of the quality of their vocational programs, the results of our review of available research, along with our site visits to 22 vocational schools and programs around the nation,[15] suggest some factors that should be considered in the context of high-quality vocational education for handicapped students based on the HSTS data: (1) location of vocational courses; (2) enrollment in work-based courses such as cooperative education or paid work experience; (3) enrollment in specific labor market preparation; and (4) training in service occupations. Findings on each of these topics are presented in the paragraphs that follow. In addition, we provide a synthesis of the vocational programs of handicapped students that includes comparisons with the programs of nonhandicapped students.

Location of Vocational Courses

As noted in a study sponsored by the National Commission for Employment Policy (NCEP),[16] research has suggested that the vocational programs offered in area vocational schools tend to be of higher quality in terms of economic return to students than those provided in comprehensive high schools. Area vocational schools typically offer vocational education that provides relatively intensive, occupationally specific skill training in trades and industry, health occupations, and technical fields--vocational programs that are thought to

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[15]Becky J. Hayward, op cit.

[16] National Commission for Employment Policy, "The Federal Role in Vocational Education: Sponsored Research" (Special Report No. 39) (Washington, DC: NCEP, 1981).

improve the employment prospects of students. Also, in part because they generally serve multiple schools or school districts, area vocational schools often have more advanced equipment and other resources for providing vocational training than is sometimes the case in comprehensive high schools. As part of our investigation of quality, therefore, we examined patterns of course-taking at area vocational schools and other off-campus locations.[17]

As shown in table 2.9, most students took their vocational education courses in their home high school; the figure for handicapped students was 62 percent compared with 84 percent for nonhandicapped students. On average, handicapped students were nearly twice as likely as their classmates to attend classes at an area vocational school (16 percent of their vocational credits versus 9 percent of other students' vocational credits). In addition, handicapped students took 22 percent of their vocational course work in other locations, which may include some combination of classes in the home high school, an area vocational school, or some other vocational training facility.

A substantially higher proportion of the vocational credits earned by handicapped students in area vocational schools were in mainstream classes (96 percent, compared with 80 percent of the vocational credits they earned in home high schools). Student transcripts contain no information about special education support services provided to students enrolled in regular classes.

Among handicapped students, patterns of attendance at area vocational schools varied considerably by the number of credits students earned in vocational education (table 2.10). Students earning relatively few credits in vocational courses (no more than 2) were unlikely to

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[17]The data reported in tables 2.9 and 2.10 should be considered lower-bound estimates of the numbers of vocational credits earned in area vocational schools for two reasons. First, in localities where the area vocational school becomes the students' school of record, these students would not have been available for sampling in HSTS, because only regular (i.e., comprehensive) high schools were included. Second, in some localities, particular courses are offered in more than one location--both the home high school and the area vocational school, or also in a community college, for example. When it was impossible to determine the location of an individual course that was listed as being offered in multiple locations, it was coded in the "other" category. Thus we believe that the incidence of credits earned in area vocational schools is somewhat underestimated by the single category "area vocational school." However, the *patterns* reflected in the data are credible because all courses were coded uniformly.

Table 2.9

Location of Students' Vocational Courses, as a Percentage of all Credits Earned in Vocational Education

Students	Percentage of All Vocational Education			
	Home High School	Area Voc. School	All Other Locations	Total
Handicapped	62.48%	16.00%	21.52%	100.00%
Nonhandicapped	84.32	8.79	6.89	100.00

SOURCE: 1987 High School Transcript Study.

attend an area school, whereas students earning more than 5 credits took nearly one-fifth of their courses at an area school and proportionately less at the home high school. Of particular interest is the finding that handicapped students who attended regular public high schools did *not* go to segregated special education centers for their vocational education course work.

Patterns of attendance at area vocational schools also varied by gender. Overall, male students were somewhat more likely than females to attend an area school (18 versus 13 percent of all credits earned by males and females, respectively), primarily because of their greater likelihood to enroll in trades and industry courses.

As with other issues relevant to the quality of vocational education courses in which handicapped students enroll, the question of the location of those courses is complicated. From the perspective of the special education community, enrollment in a vocational program at an area vocational school may be thought to contradict the goals of EHA to the extent that students are being separated from their nonhandicapped classmates, who earned relatively more of their vocational credits at the home high school.

As noted earlier, however, research on vocational education suggests that area vocational schools are likely to offer more occupational choices and more extensive training in

Table 2.10

Location of Vocational Courses by
Range of Credits Earned in Vocational Education
and Gender for Handicapped Students

Student Characteristic	Course Location				
	Home School	Area Vocational Institution	Special Education Center	Other	Total
Number of vocational credits					
0.0 - 2.00	73.87%	6.08%	<0.01%	19.72%	100%
2.01 - 5.00	69.80	10.30	0.03	17.98	100
More than 5.00	58.31	18.90	0.01	22.90	100
Gender					
Male	62.2	17.6	<0.01	20.2	100
Female	62.7	12.9	<0.01	24.3	100

SOURCE: 1987 High School Transcript Study.

a variety of occupational fields than home high schools do.[18] Many home high schools provide only a limited set of vocational offerings. So, the area school may offer a higher payoff for students than many of the vocational courses available at their home high schools. From the perspective of the vocational education community, enrollment in programs at area vocational schools may be one measure of quality in vocational education and an indicator that handicapped students do have access to high-quality programs.

[18]Becky J. Hayward, Nancy E. Adelman, and Richard N. Apling, *Exemplary Secondary Vocational Education: An Exploratory Study of Seven Programs*, NAVE Contractor Report (Washington, DC: Policy Studies Associates, 1988).

Work-Based Courses

Research and student follow-up studies conducted in recent years have identified participation in unsubsidized, paid, competitive work during the high school years as an important--perhaps the most important--determinant of successful labor force entry and job retention for handicapped youth. Hasazi, Gordon, and Roe report, for example:

> Having competitive part-time and summer jobs during high school were each significantly related to PTE [percent time employed] since high school. Those who had such jobs were employed about 64 percent of the time on average, against 34 percent for those who did not. . . .This relationship was significant and analogous over all levels of location, gender, and level of functioning.[19]

These researchers report further that "real work experiences during high school" were related to employment stability after school, and that participating in vocational education was also related to postschool employment, although less strongly than holding a competitive job. Unpaid or even subsidized work, however, was not a significant predictor of postschool PTE.

A follow-up study of students in Maryland found that both handicapped and other students who participated in vocational programs during high school experienced more employment stability and job satisfaction than those who took no vocational education.[20] This finding has also emerged from early analyses of data collected during the national longitudinal study of handicapped youth by the Office of Special Education Programs (OSEP), which reports that handicapped students enrolled in vocational education in high school had a significantly higher likelihood of gaining employment after leaving school than did students who did not take vocational courses.[21]

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[19]Susan B. Hasazi, L. R. Gordon, and C. A. Roe, "Factors Associated with the Employment Status of Handicapped Youth Exiting High School from 1979 to 1983," *Exceptional Children*, 51(6) (1985): 455-69.

[20]D. S. Clark, D. L. Hayden, and L. L. Lezzer, *The Effectiveness of the Special Education Program: Rethinking the Initiative* (Baltimore, MD: Maryland State Department of Education, 1987).

[21]L. Newman, *Employment Outcomes of Youth with Disabilities: Preliminary Studies from the National Transition Study* (Menlo Park, CA: SRI International, 1988).

The way the special education community defines work-based courses differs substantially from the way they are defined by the vocational education system. For the purposes of the study findings reported in this chapter, we have defined this component of vocational education in the terms used by vocational educators, which divide work-related courses into three categories. Accordingly, the transcript coding system used in HSTS was revised to capture the extent to which students were earning credits for participation in three different types of work-based courses: (1) *cooperative education*, in which students work during their last year in high school at a paid competitive job in the occupational field in which they have received training during high school; (2) *paid competitive* (unsubsidized) work experience, in which students work for pay at a job that may or may not be related to any vocational courses they are taking; and (3) *unpaid* volunteer or subsidized (at subminimum wage) work study, which includes the cafeteria, grounds maintenance, or office assistant jobs that have traditionally constituted high school work-study programs for handicapped students. (The extent to which students held part-time or summer jobs for which they did not receive high school credit does not appear on transcripts.) Given the findings cited previously, our hypothesis was that participation in competitive work during high school, particularly in conjunction with a program of vocational skill training and appropriate mentoring and supervision, would be one measure of high-quality vocational education for handicapped students.

Analysis of data from HSTS shows that relatively few of the vocational credits earned by handicapped high school students were in cooperative education or paid work experience (table 2.11). Neither were these students earning many credits in unpaid work study, although their enrollment in unpaid work study was proportionately higher than in either paid work experience or cooperative education. Of the 0.87 credit earned in work-based courses of any type, 54 percent was in unpaid work-study. Nonhandicapped students earned considerably fewer credits in work-based courses (0.39 credit overall) than did handicapped students, but proportionately more of such credits in cooperative education (44 versus 14 percent for

Table 2.11

Average Credits Earned by Handicapped and Nonhandicapped Students in Work-Based Courses

Type of Course	Handicapped Students		Nonhandicapped Students	
	Average Number of Credits	Percentage of all Work-based Courses	Average Number of Credits	Percentage of all Work-based Courses
Cooperative education	0.12%	13.79%	0.17%	43.59%
Paid work experience	0.28	32.18	0.09	23.08
Unpaid work study	0.47	54.02	0.13	33.33
Total	0.87	100.00	0.39	100.00
Average number of credits in vocational education	5.20	-	4.03	-
Work-based courses as a percentage of all vocational education courses	-	16.73	-	9.68

SOURCE: 1987 High School Transcript Study.

handicapped students). Overall, about 17 percent of the vocational credits earned by handicapped students were in one of the three types of work-based courses, compared with less than 10 percent of the credits earned by nonhandicapped students. Approximately 38 percent of handicapped students earned at least some credits in work-based courses (versus 22 percent of other students).

The Perkins Act, in calling for services to facilitate school-to-work transition, speaks to the need for improving handicapped students' preparation for labor force participation. In light of the research noted previously, enrollment in work-based courses potentially provides

handicapped students with a means of becoming integrated into the labor force. But different forms of work-based courses are offered to high school students, and they almost certainly differ in value to students. Cooperative education, in which students typically work at paid jobs (often above minimum wage) in the occupational area in which they have taken a program of studies, is generally viewed as the best form of such courses.

Cooperative education has a classroom component, in which students learn ways to improve their employability and other skills. Cooperative education also includes a formal contract among the student, school, and employer; the employer participates in evaluation of the student's job performance. Finally, the teacher, usually called the "coop coordinator," visits the worksite and monitors student performance; the coordinator can serve as a supervisor-mentor as students learn their jobs and hone the job-related skills they learned in the classroom. As is evident from table 2.11, only about 10 percent of the work-based courses in which handicapped students earned credits were in cooperative education; nonhandicapped students were more than twice as likely to earn their work-based credits in cooperative education.

Unlike cooperative education, paid work experience during high school is not typically the capstone of a program of preparation for a specific occupation. The extent to which students receive the type of supervision in paid work experience that is a major component of cooperative education programs probably varies widely from district to district. Student transcripts do not provide enough information to permit analysis of this issue, although the paid work experience included in this analysis is limited to courses for which students were earning credit, which may imply supervision.

Overall, the proportion of work-based course credits that include paid work was considerably higher for nonhandicapped students (67 percent) than for handicapped students (46 percent). The difference is explained by the fact that more than half of handicapped students' work-based credits were in unpaid work study. Although the research cited earlier suggests that handicapped students receive little return for this type of course work, some

educators involved in school-to-work transition services for handicapped students disagree on this subject. During our site visits to model transition programs, we observed several programs that have adopted sequenced work-related services for participants; students begin in unpaid work-study, but as they learn needed work-related skills and gain confidence, they move into paid work experience during their junior or senior year in high school.

The number of credits, as well as the percentage of all their vocational credits, that handicapped students earned in the three types of work-based courses varied with student characteristics (see table 2.12). Mentally retarded students earned more credits in work-based courses (1.29) and more credits in vocational education overall (see table 2.8) than students with all other handicapping conditions, although students with other conditions earned proportionately more of their vocational credits in work-based courses (32 percent). Students who had moderate to severe cognitive or psychosocial limitations earned somewhat more of their vocational credits in work-based courses than did those who were mildly limited or not affected.

Black students earned a somewhat higher proportion of their vocational credits in work-based courses than did students in other ethnic groups, although the differences were not large. Patterns of credits earned in these courses also differed according to gender. Twenty percent of the vocational credits earned by female handicapped students were in work-based courses, while 15 percent of male students' vocational credits were in this area. The implications of these patterns for the vocational programs of handicapped students, particularly females, are addressed in the final section of this chapter.

Specific and General Labor Market Preparation

Vocational education offers two kinds of labor market preparation: specific and general. The "specific" category includes vocational course work in skill areas (e.g., agricultural science, secretarial training, welding), the completion of which should enable a student to obtain a job or enter further training (or both) in that skill area. The "general" category includes introductory courses (some work experience, general industrial arts, typing,

Table 2.12

Credits Earned by Handicapped Students
in Work-Based Courses, by Student Characteristics

Student Characteristic	Average Credits in Work-based Courses	Percentage of all Vocational Education
Handicapping condition		
Learning disability	0.73	13.72%
Mental retardation	1.29	23.04
Serious emotional disturbance	0.94	20.39
All other conditions	1.52	31.67
Cognitive limitation		
Severe/moderate	1.01	19.39
Mild	0.78	14.31
Not affected	0.74	14.83
Psychosocial limitation		
Severe/moderate	0.89	19.87
Mild	1.03	18.73
Not affected	0.80	14.57
Race/ethnicity		
White	0.83	15.12
Black	1.01	22.15
Hispanic	0.86	18.74
Other	0.90	18.00
Gender		
Male	0.80	15.24
Female	1.04	20.23

SOURCE: 1987 High School Transcript Study.

vocational mathematics) that impart various skills and behaviors that will be useful in most types of jobs and permit students to explore career concepts before selecting a specific skill area.

Some of the research on vocational education suggests that completion of a program of specific labor market preparation improves the postschool employment prospects of high school students.[22] As one aspect of our investigation of the quality of the vocational education in which handicapped high school students enrolled, we analyzed their patterns of participation in such courses (that is, their pursuit of a sequenced set of courses in a specific skill area).

As data reported in table 2.13 show, handicapped students on average earned a somewhat lower proportion of their vocational credits in specific labor market preparation than did other students, although the difference was not large (61 percent versus 64 percent).[23] In addition, the proportion of specific labor market credits in a second or later course--indicating pursuit of a program of studies--was somewhat lower (14 percent of the credits that handicapped students earned in vocational education versus 19 percent of those earned by other students). The important point, however, may well be that relatively few students, handicapped or not, appeared to be pursuing a real vocational sequence.

As with work-based courses, student characteristics affected handicapped students' patterns of course-taking in specific labor market preparation (see table 2.14). In terms of overall credits and proportion of all vocational education credits, students with learning disabilities and serious emotional disturbances earned more credits in specific labor market courses than did students with other handicapping conditions. (These students also earned slightly more of their vocational credits in specific labor market preparation than did nonhandicapped students overall.) Nearly two-thirds of their vocational credits were in a specific skill area.

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[22]J. H. Bishop, "Occupationally Specific Training in High School," in G. H. Copa, J. Plihal, and M. A. Johnson, (eds.), *Revisioning Vocational Education in the Secondary School* (St. Paul, MN.: University of Minnesota, Minnesota Research and Development Center for Vocational Education, 1986).

[23]Because handicapped students earned more credits in vocational education than did other students (5.20 versus 4.03 average credits), the 61 percent of the average handicapped student's vocational credits represents more than 3 full-year courses in specific labor market preparation, in contrast to about 2.5 full-year courses for other students.

Table 2.13

Average Number of Credits Earned by Handicapped and Nonhandicapped Students in General and Specific Labor Market Preparation

Vocational Area	Handicapped Students Average Credits	Nonhandicapped Students Average Credits
General labor market	1.35	0.88
Specific labor market	3.16	2.59
First course in a sequence	1.89	1.53
Second or later course	0.75	0.76
Nonsequential course	0.52	0.30
Specific labor market credits as a percentage of all vocational credits	60.77%	64.24%

SOURCE: 1987 High School Transcript Study.

Conversely, less than 50 percent of the vocational credits earned by mentally retarded students were in such courses. All levels of psychosocial limitation appeared to constrain the proportion of vocational credits earned in specific labor market courses, as did moderate to severe cognitive limitations. Students without psychosocial limitations earned more than 60 percent of their vocational credits in specific labor market preparation, versus less than 50 percent among students having such limitations. Similarly, students without cognitive limitations earned 66 percent of their vocational credits in specific labor market courses, versus 47 percent of credits earned by students with moderate to severe cognitive limitations.

White handicapped students earned a somewhat higher proportion of their vocational credits in specific labor market preparation than did students in other ethnic groups, but the disparity in proportion of credits earned in specific labor market preparation by gender is

Table 2.14

Credits Earned by Handicapped Students in
Specific Labor Market Preparation, by Student Characteristics

Student Characteristic	Average Number of Credits	Percentage of all Vocational Education
Handicapping condition		
Learning disability	3.47	65.23%
Mental retardation	2.65	47.32
Serious emotional disturbance	2.93	63.56
All other conditions	2.43	50.63
Cognitive limitation		
Severe/moderate	2.43	46.64
Mild	3.25	59.63
Not affected	3.29	65.93
Psychosocial limitation		
Severe/moderate	2.16	48.21
Mild	2.53	46.00
Not affected	3.40	61.93
Race/ethnicity		
White	3.48	63.39
Black	2.40	52.63
Hispanic	2.65	57.73
Other	2.98	59.60
Gender		
Male	3.51	66.86
Female	2.45	47.67

SOURCE: 1987 High School Transcript Study.

more striking: male handicapped students earned 67 percent of their vocational credits in specific labor market courses, while female students earned only 48 percent of their credits in those courses. (The differences in gender are accounted for in part by the substantially higher enrollment in consumer and homemaking education by all female students, both handicapped

and nonhandicapped.) Thus, although on average, handicapped and other students earned about the same proportion of their vocational credits in specific labor market courses, considerable variation on these proportions occurred across student characteristics.

Service Occupations[24]

Even if handicapped students did have access to specific labor market preparation, to what extent was that preparation predominantly geared toward low-paying, dead-end jobs in service occupations? This question bears on the overall issue of the quality of vocational education courses and programs available to handicapped high school students.

The transcript data show that relatively few of the credits earned by handicapped students were in service occupation courses, although averages for handicapped students were slightly higher than those among other students (see table 2.15). Overall, about 13 percent of the vocational credits earned by handicapped students were in service occupation courses, compared with 10 percent of vocational credits earned by other students. Thirty-six percent of handicapped students earned at least some credits in training for service occupations, compared with 29 percent of nonhandicapped students. Both handicapped and other students earned more credits in food services courses (0.28 and 0.13, respectively) than they did in any other single type of service occupation course.

Thus, most handicapped students did not spend a large amount of their time in vocational education training for employment in service occupations; nor did they seem disproportionately enrolled relative to the patterns exhibited by other students.

With the exception of gender, variation across student characteristics in terms of credits earned in service occupation courses was not great (see table 2.16). Gender differences were marked, with female handicapped students earning more than 26 percent of all their vocational credits in service occupation courses, compared to only 6.5 percent of the vocational credits earned by their male classmates in these fields. (Comparable percentages for nonhandicapped

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[24]A description of the basis for our analysis of service occupations is presented in appendix B.

Table 2.15

Average Numbers of Credits Earned by Handicapped and Nonhandicapped Students in Training for Service Occupations

Service Occupation	Handicapped Students	Nonhandicapped Students
Apparel	0.06	0.05
Building Maintenance	0.04	<0.01
Cosmetology	0.03	0.05
Food Service	0.28	0.13
Health Service	0.09	0.04
Household Service	0.16	0.11
Lodging	<0.01	<0.01
Personal Service	0.01	0.01
Protective Service	<0.01	<0.01
Recreation	<0.01	<0.01
Total	0.66	0.40
Average number of credits in vocational education	5.20	4.03
Credits in service occupations as a percentage of all vocational education	12.69%	9.93%

SOURCE: 1987 High School Transcript Study.

students were 16 percent of all vocational credits for females and 4 percent for male students.) Thus, although nonhandicapped female students earned proportionately fewer of their vocational credits in service courses than did handicapped female students, the fact that both groups of female students earned substantially more credits in education for employment in service occupations than their male counterparts suggests that the influence of gender on

Table 2.16

Number of Credits Earned by Handicapped Students in Training for Service Occupations, by Student Characteristics

Student Characteristic	Average Number of Credits	Percentage of all Vocational Education
Handicapping condition		
Learning disability	0.79	14.85
Mental retardation	0.64	11.43
Serious emotional disturbance	0.82	17.79
All other conditions	0.68	14.17
Cognitive limitation		
Severe/moderate	0.74	14.20
Mild	0.67	12.29
Not affected	0.63	12.63
Psychosocial limitation		
Severe/moderate	0.50	11.16
Mild	0.70	12.84
Not affected	0.74	13.48
Race/ethnicity		
White	0.66	12.02
Black	0.73	16.01
Hispanic	0.47	10.24
Other	0.73	14.60
Gender		
Male	0.34	6.48
Female	1.35	26.26

SOURCE: 1987 High School Transcript Study.

occupational choices, which has characterized secondary vocational education for decades, continues to be an important factor in the vocational programs that both handicapped and other students take in high school.

Programs of Study

One way to view the implications of these findings for the quality of handicapped students' vocational education is to consider how the various components--location of courses, participation in work-based courses, enrollment in specific labor market preparation, training in service occupations versus other fields of study--fit together. That is, to what extent can these data provide insight into the vocational *programs* of handicapped high school students? Finally, how do the handicapped students' programs, in a broad sense, differ from the programs of other students?

In tables 2.17 and 2.18, we synthesize information on the programs of handicapped and nonhandicapped female and male students in order to provide a picture of the vocational programs of "average" students in each of these groups. We have selected gender as a differentiating characteristic for two reasons: first, as just noted, for both handicapped and other students, gender continues to influence both the types of vocational courses in which they enroll and the amount of credits they earn in various categories. Second, examination of course-taking by gender reveals some important differences between the vocational education course-taking of handicapped as opposed to other students.

As shown in table 2.17, female students continued to enroll in a considerable amount of consumer and homemaking education at the high school level, with more than 26 percent of vocational credits earned by handicapped females in this area, compared with 20 percent of the credits earned by other female students. Table 2.18 shows that both handicapped and other male students took about the same amount of consumer and homemaking education (around 7 percent of all credits earned in vocational education). Some consumer and homemaking education courses may be particularly useful for handicapped students, as well as for other students; courses like "Adult Roles and Functions" or "Family Living" teach the types of independent living skills that can be helpful to teenagers as they prepare to make the transition into adult life.

Table 2.17

Vocational Programs of Handicapped and Nonhandicapped Female Students

Subject	Female Students			
	Handicapped		Nonhandicapped	
	Average Number of Credits	Percentage of all Vocational Education[a/]	Average Number of Credits	Percentage of all Vocational Education[a/]
Consumer and homemaking education	1.35	26.26%	0.82	20.35%
Work-based courses	1.04	20.24	0.47	11.66
Cooperative education	0.20	3.89	0.23	5.71
Paid work experience	0.30	5.84	0.09	2.23
Unpaid work study	0.54	10.51	0.15	3.72
Specific labor market	2.45	47.67	2.28	56.58
Services	1.35	26.26	0.64	15.88
Business and office	0.54	10.51	1.30	32.26
Trades and industry	0.30	5.84	0.21	5.21
All other	0.26	5.06	0.13	3.23
Total number of vocational education credits	5.14	-	4.03	-

SOURCE: 1987 High School Transcript Study.

a/ Columns do not add to 100 percent or total credits because of overlapping categories (i.e., some of the courses in the work-based category are also specific labor market courses), and no credits are shown for general labor market preparation.

Perhaps the most striking aspect of the programs of handicapped female students is the low proportion of their vocational credits that were in potentially higher payoff areas. Only about 16 percent of their 5.14 credits were in business and office or trades and industry. This percentage compares with 37 percent for other female students, 45 percent for handicapped male students, and 55 percent for other male students.

Table 2.18

Vocational Programs of Handicapped and Nonhandicapped Male Students

Subject	Male Students			
	Handicapped		Nonhandicapped	
	Average Number of Credits	Percentage of all Vocational Education[a/]	Average Number of Credits	Percentage of all Vocational Education[a/]
Consumer and homemaking education	0.39	7.43%	0.29	7.20%
Work-based courses	0.80	15.24	0.32	7.94
Cooperative education	0.09	1.71	0.11	2.73
Paid work experience	0.26	4.95	0.10	2.48
Unpaid work study	0.44	8.38	0.11	2.73
Specific labor market	3.51	66.86	2.91	72.21
Services	0.34	6.48	0.15	3.72
Business and office	0.20	3.81	0.55	13.65
Trades and industry	2.18	41.52	1.65	40.94
All other	0.79	15.05	0.56	13.90
Total number of vocational education credits	5.25	-	4.03	-

SOURCE: 1987 High School Transcript Study.

a/ Columns do not add to 100 percent or total credits because of overlapping categories (i.e., some of the courses in the work-based category are also specific labor market courses), and no credits are shown for general labor market preparation.

The chief difference between handicapped and other female students, in fact, was in business and office occupations. Nonhandicapped female students on average earned 32 percent of their vocational credits in training for office occupations, which was three times as high as the proportion of handicapped female students' vocational credits in that subject. As noted earlier in this chapter, female handicapped students often lack access to office occupations, and--given their disproportionate enrollment in training for service occupations--

their access to high-quality vocational education relative to nonhandicapped female and all male students is an issue that requires attention.

Male nonhandicapped students earned proportionately more credits than their handicapped peers in specific labor market preparation, but the difference was not great (72 versus 67 percent). Handicapped male students earned slightly more credits in trades and industry than other male students (42 versus 41 percent), and they earned about the same in other fields, with the exception of business and office. As was the case with handicapped females, handicapped male students earned proportionately more credits in work-based courses. In general, then, the patterns of handicapped males seemed closer to those of other males than was the case with females or between handicapped females and all other groups.

IMPLICATIONS

The findings presented in this chapter shed light on issues of concern to policymakers and educators regarding handicapped students' participation in vocational education. In this section, we discuss some of those implications and suggest issues that need further investigation in the context of high-quality secondary vocational education for handicapped students.

Do Handicapped Secondary Students Have Access to the Full Range of Vocational Programs Available to Other Students?

Overall, handicapped students attending regular public high schools have access to vocational education. Most of the credits they earn in vocational education are in regular classes, and overall they spend a greater share of their time and earn more credits in vocational courses than other students do. Furthermore, a larger proportion of the courses in which handicapped students enroll are taught at area vocational schools, where many of the occupationally specific programs available to high school students are offered. Finally, although the *courses* in which they enroll may differ, most handicapped students have access to the same types of vocational *programs* (general and specific labor market preparation, work-based courses) and the same broad vocational areas (agriculture, trades and industry, and the

like) as other students. The main exception to this finding is their low enrollment in business and office occupations.

Do Handicapped Students Have Access to High-Quality Vocational Education?

As noted earlier in this chapter, the question of *high-quality* vocational education is complicated in any event, and more so to the extent that we do not have postschool outcome data for students in the transcript study. Nevertheless, some inferences concerning the quality of the vocational programs available to handicapped students can be drawn on the bases of our examination of patterns of enrollment at area vocational schools; enrollments in three types of work-based courses; specific labor market preparation; and enrollment in service occupation programs.

Our findings indicate that handicapped students earn relatively more of their vocational credits in classes offered at area vocational schools, with the amount of time they spend at area schools increasing in proportion to the total credits they earn in vocational education. Furthermore, a substantially higher proportion of the credits handicapped students earn at area schools are in mainstream classes, compared with the vocational credits they earn at the home high school. To the extent that the courses they take at area vocational schools constitute *programs* of preparation for specific occupational fields that they expect to enter following graduation, handicapped students appear to be participating in high-quality vocational education. The fact that handicapped male students earn a large share of their credits in trades and industry (more, in fact, than do nonhandicapped male students) lends some credence to this inference.

It is not clear that vocational and special educators agree entirely on the appropriate goals for handicapped students. On the one hand there is the impetus (fostered by the Perkins Act) to provide these students with the highest-quality occupational preparation that is available in their localities and appropriate to their individual goals and capabilities. On the other hand, there is the goal (set forth in the Education of All Handicapped Children Act) of appropriate integration into the educational programs available to nonhandicapped students. To

the extent that this latter goal is defined by retention at the home high school, special educators may view disproportionately higher enrollment of handicapped students in courses at area vocational schools as a problem.

The importance of work-based educational experiences for handicapped students is another area where differences of opinion arise. All handicapped students, and particularly females, earn a higher proportion of their vocational credits in work-based courses than other students do. Given the direction of recent research on services that help handicapped students obtain employment after they leave school, this finding suggests that at least some students are receiving preparation that will help them enter and persist in the labor market. At the same time, however, many of these enrollments are in unpaid work study, which may be of limited use in getting students into real jobs after high school.

It is clear that relatively few handicapped or other students spend much time in cooperative education, which has traditionally been acknowledged as the capstone of a high school vocational program that prepares students to enter the labor market. The advantages of cooperative education (including competitive employment in the field for which they have trained, careful supervision by a teacher-mentor, involvement of the employer in evaluating students' progress, and a classroom component whose objective is to help students learn how to get along in the workplace) are particularly important for handicapped students, who face all the difficulties in making a transition from school to work as well as the special barriers (discrimination, low expectations on the part of employers and others, parental fears) that have limited the integration of persons with disabilities into mainstream society.

Cooperative education may not always be a realistic option for all handicapped students, but the importance of supervised, paid work in preparing handicapped students for labor force participation suggests that greater emphasis should be placed on this component of their vocational programs. Among the activities that appear to be key in this regard are:

- Paid, supervised (but unsubsidized) work (preferably in an occupational field related to training) during high school;
- Effective job development and placement; and

- Follow-along services (at least initially) to provide needed assistance to students as they become acclimated to the culture and demands of the workplace.

On average, handicapped students earn about the same proportion of their vocational credits in specific labor market preparation as their nonhandicapped classmates, and to the extent that this type of training facilitates postschool success, they appear to have access to good vocational education. However, female handicapped students earn relatively more credits in training for service occupations, many of which do not offer much potential for a career path, and these students have limited access to business and office occupations compared with other female students. Given their patterns of vocational course-taking, it appears that sex stereotyping is a particular problem for handicapped female students, an issue that requires attention in the context of ensuring handicapped students' access to high-quality secondary vocational education. The fact that minority handicapped students earn relatively fewer credits in programs of training for specific occupations requires attention as well.

To What Extent Do Demographic and Other Characteristics Affect Handicapped Students' Access to High-Quality Vocational Education? Do These Characteristics Affect Nonhandicapped Students' Enrollments in Similar Ways?

As would be expected, student characteristics affect the nature of vocational courses in which handicapped students enroll. For example, mentally retarded students earn a higher proportion of vocational credits in self-contained classes than do students with other handicapping conditions. This pattern also applies to students with a variety of disabilities whose cognitive limitations are moderate to severe, and students who are black or Hispanic. Handicapped students overall enroll in more work-based courses but are more likely to participate in unpaid work study than other students. Gender has at least as strong an effect on the types of courses handicapped students take as it has for other students. In some subjects (e.g., business and office), handicapped students are likely to be underenrolled relative to other students, a pattern that holds for both female and male students but has a greater effect on females in this traditionally "female" field.

These findings suggest that while the intent of Congress that handicapped students have access to vocational education at the secondary level is being implemented nationally, the mandate of Congress to encourage nontraditional enrollments in vocational fields has not been achieved. Nor has the objective to ensure equal access to all persons regardless of race/ethnicity. Moreover, our data suggest that these continuing problems may affect female handicapped students disproportionately. That is, while male handicapped students enroll in trades and industry in about the same proportions as other male students, female handicapped students are more likely to take more consumer and homemaking education and more training for service occupations than any other group, and black students are less likely to earn credits in specific labor market preparation. Greater efforts are required to ensure that all students have access to programs that will help to maximize their postschool employment and educational opportunities.

Fundamental to the nation's special education system is the concept that each student in the country has a right to a "free appropriate public education," to be provided in the "least restrictive environment" that accommodates individual students' needs. The variability we found in the amounts and types of vocational courses and programs in which handicapped students are earning credits may well reflect a sensitivity on the part of special and vocational educators to individual students' needs that can be taken as a positive development in high school education. At the same time, researchers need to investigate the extent to which high school vocational course-taking by handicapped students does in fact increase their labor force participation and integration into the mainstream of American society after school, particularly given recent research findings that vocational education and services appear to increase handicapped students' likelihood of successful labor force entry. As noted in the previous discussion, it is particularly important to make sure that high-quality work-based courses are available to all students, that female and minority students have access to occupations with reasonable likelihood of economic return, and that transition services be provided to help students meet their occupational objectives.

CHAPTER 3

VOCATIONAL ENROLLMENT PATTERNS OF DISADVANTAGED HIGH SCHOOL STUDENTS

INTRODUCTION

A major goal of the Perkins Act is to expand the access of students who are academically or economically disadvantaged to high-quality vocational programs. This chapter presents the results of analyses that compare the types of vocational education courses taken by academically disadvantaged high school students with those taken by their high-achieving peers. The key questions that guided these analyses are the following:

- What are the enrollment patterns of academically disadvantaged high school students in vocational education?
- Do these students have access to high-quality vocational programs?
- In addition to disadvantagement, in what ways do other demographic characteristics, such as gender and race/ethnicity, affect the types of vocational programs in which disadvantaged students enroll? Do these characteristics affect the vocational enrollments of advantaged students in similar ways?
- In what ways do the vocational education programs and course-taking options available to advantaged and disadvantaged students differ among schools?
- What are the implications for the targeting of resources and activities to increase the access of disadvantaged high school students to vocational education?

The analyses reported here are based on two main data sources. The principal source for comparing patterns of course-taking at the student level is the 1987 High School Transcript Study (HSTS). Because academically disadvantaged students are less likely to graduate with their class, most of the student-level analyses presented in the chapter are based on students who were in the 11th grade when they were sampled (in school year 1985-86) rather than on

1987 graduates.[25] The data source used to analyze the effects of school characteristics on the quality of programs and course-taking options for students is the sophomore cohort of the High School and Beyond (HS&B) survey. A subset of the sophomore cohort, consisting of 6,600 students with transcripts in 770 public schools, was used for purposes of the analysis. This data set contains information on the background characteristics of students and schools needed to analyze school-level effects. The school-level analyses are based on students in the sophomore cohort of HS&B who graduated in 1982.

Under the Perkins Act, students who are either academically or economically disadvantaged are eligible to receive special services, funded under the 22 percent set-aside, the intent of which is to help these students succeed in the full range of vocational programs available to other students. These services include assessment, career counseling, curricular adaptations, and the like (Section 204[c]).

Information available on student transcripts was used to classify students as academically disadvantaged or advantaged. Based on Perkins Act regulations that specify a grade point average of less than 2.0 (C average) on a four-point scale as one criterion for determining academic disadvantagement, we classified each student into one of three categories:

- *Academically disadvantaged*--students whose grade point average was less than 2.0 (23.8 percent of the students);
- *Academically nondisadvantaged*--students whose grade point average was between 2.0 and 2.9 (50.8 percent of the students); and
- *Academically advantaged*--students whose grade point average was 3.0 or higher (25.4 percent of the students).

To address the key questions of this study, we first present a profile of academically disadvantaged high school students that provides a context for understanding the findings on

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[25]The inclusion of nongraduates does not necessarily mean that less than four years of transcript data were available for analysis. For students in the sample who graduated or were still enrolled in spring 1987, transcripts contain four years of high school courses. For students who dropped out either between their junior and senior year or during their senior year, however, fourth-year course data were either missing or incomplete.

vocational enrollment patterns. Following this profile, we present (1) a description of disadvantaged students' access to vocational programs, (2) an analysis of the quality of the vocational programs in which they enroll, and (3) an examination of the influence of school characteristics on students' vocational options. Our analysis of the quality of students' vocational course-taking includes information on (1) the location of vocational courses; (2) enrollment[26] in occupationally specific vocational courses; (3) enrollment in work-based courses, including cooperative education; (4) enrollment in training for service occupations; and (5) analysis of the vocational programs available to students in different types of schools. The school-level analysis presents findings on the quality of vocational education available in schools with high and low concentrations of academically and economically disadvantaged students. The final section of the chapter discusses some of the implications of the findings.

PROFILE OF DISADVANTAGED SECONDARY STUDENTS[27]

The characteristics and educational experiences of disadvantaged secondary students differ from those of advantaged students along a number of dimensions. In this section we describe the characteristics of students in each group and provide an overview of their high school programs.

Demographic Characteristics

Academically disadvantaged high school students differ markedly from their advantaged peers in terms of race/ethnicity, gender, and age for grade. As shown in table 3.1, academically disadvantaged students are considerably more likely to be black or Hispanic than white. They are more than five times as likely to be black and three times as likely to be Hispanic as high-achieving students. Variations in gender across the groups are also striking.

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[26]Throughout the chapter *enrollment* is defined as "average credits earned."

[27]Because their high school experiences are treated separately in this report, handicapped students are excluded from the analyses presented in this chapter.

Table 3.1

Characteristics of Academically Disadvantaged and Advantaged High School Students

Student Characteristic	Academic	
	Disadvantaged	Advantaged
Race/ethnicity		
White	67.6%	87.8%
Black	21.5	4.7
Hispanic	8.7	2.7
Other	2.2	4.8
Total	100.0	100.0
Gender		
Male	60.1	39.6
Female	39.9	60.4
Total	100.0	100.0
Age in 12th grade		
19 or older	20.3	3.1
18	54.7	63.2
17	24.9	33.5
16	0.1	0.2
Under 16	0.	0.1
Total	100.0	100.0
Percentage of Population	23.8	25.4

SOURCE: 1987 High School Transcript Study.

Academically disadvantaged students are considerably more likely to be male than female (60 versus 40 percent), whereas the reverse is true among high-achievers (60 percent of whom are female). Finally, academically disadvantaged students tend to be older for their grade than their advantaged peers. About 20 percent of such students were 19 years old or older in the

12th grade (versus 3 percent of high-achieving students), suggesting that their educational progress is slower than it is among their advantaged peers.

Educational Status[28]

The differential between disadvantaged and advantaged students in terms of educational progress in their last year of high school is reflected in graduation and dropout rates (table 3.2). As would be expected, low-achieving students were substantially less likely to have graduated with their class than high-achieving students (63 percent versus 97 percent). Perhaps even more marked is the variation in dropout rates. In their last year of high school, nearly 13 percent of low-achieving students dropped out of high school, compared with less than 1 percent of their high-achieving peers. These numbers are probably underestimates of the actual dropout rates. Students were counted as having dropped out only if their records provided clear documentation of this status. Thus, some proportion of those students classified as "other" are also likely to have dropped out of school in their senior year.

Table 3.3 presents an overview of the high school programs of disadvantaged and advantaged students based on credits earned in academic, vocational, and personal/other subjects.[29] Low-achieving students earned an average of 18.58 credits overall in high school, while high achievers earned 24.87. Low-achieving students earned substantially *fewer* total credits in *academic* subjects than did their advantaged peers (11.75 versus 19.24). In addition,

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[28]Analyses presented in the remainder of this chapter are based on students whose eligibility for sample selection was that they were in the 11th grade at the time the sample was drawn (school year 1985-86). Because disadvantaged students have a greater tendency to be "at risk" for leaving school before graduation, using this group for comparing the educational experiences of disadvantaged and nondisadvantaged students provides a more accurate picture than would have been possible if the analyses had been limited to students who graduated from high school with their class in spring 1987.

[29]The high school courses included in the categories of academic, vocational, and personal/other are defined in the Secondary School Taxonomy, as published in National Assessment of Vocational Education, *First Interim Report* (Washington, DC: Department of Education, January 1988). The vocational category includes courses in consumer and home economics, general labor market preparation, and specific labor market preparation.

Table 3.2

Exit Status of Disadvantaged and Advantaged Students

Exit Status	Academic	
	Disadvantaged	Advantaged
Graduated with class	63.4%	97.3%
Certificate of attendance	0.3	0.0
Still enrolled	5.4	0.4
Dropped out	12.7	0.1
Other[a/]	18.3	2.2
Total	100.0	100.0

SOURCE: 1987 High School Transcript Study.

a/ Includes transferred, GED (general equivalency diploma), and unknown status.

academic credits represented a lower share of the overall high school programs for disadvantaged students (63 percent versus 77 percent of all credits).

In contrast, academically disadvantaged students earned *more* credits in *vocational* subjects than their advantaged peers, and vocational credits accounted for about twice as high a share of their overall high school programs. Low-achieving students' 4.39 vocational credits represented nearly one-fourth of their total high school credits, whereas high-achieving students' 3.01 vocational credits accounted for only 12 percent of their overall programs. Finally, both categories of students earned approximately the same number of credits in personal/other courses, a category that includes courses such as health and physical education, driver education, military science, or religion. These courses represented about the same

Table 3.3

Average Credits Earned in High School by Disadvantaged and Advantaged Students

	Academic			
	Disadvantaged		Advantaged	
Course Area	Average Number of Credits	Percentage of All Credits	Average Number of Credits	Percentage of All Credits
Academic	11.75	63.2%	19.24	77.4%
Vocational	4.39	23.6	3.01	12.1
Personal/other	2.44	13.1	2.62	10.5
All credits	18.58	100.0	24.87	100.0

SOURCE: 1987 High School Transcript Study.

proportion of the high school programs of all students (13 percent for low-achieving and 11 percent for high-achieving students).

VOCATIONAL ENROLLMENT PATTERNS

Nearly all students enroll in vocational courses in high school. As data reported in table 3.4 show, more than 97 percent of low-achieving students and 95 percent of high-achieving students earned at least some credits in vocational education. In terms of the intensity of their vocational course-taking, however, the patterns of enrollment that characterized the two groups were reversed. About 24 percent of low-achieving students earning any credits in vocational education earned 2 or fewer credits, whereas 48 percent of this group earned more than 4 credits, and 25 percent earned more than 6 credits. Among high-achieving students, 43 percent earned 2 or fewer credits and only 25 percent earned more

Table 3.4

Vocational Education Enrollments of Academically Disadvantaged and Advantaged High School Students

Credits Earned in Status	Disadvantaged	Advantaged	All Students[a/]
0	2.76%	4.57%	2.98%
0.01 - 0.50	3.72	7.83	4.73
0.51 - 1.00	6.79	13.96	8.55
1.01 - 2.00	13.13	21.39	15.32
2.01 - 3.00	13.78	16.43	14.22
3.01 - 4.00	11.98	11.30	12.55
4.01 - 5.00	12.06	8.56	11.10
5.01 - 6.00	10.57	5.53	8.84
>6.00	25.20	10.42	21.71
Total	100.00	100.00	100.0

SOURCE: 1987 High School Transcript Study.

a/ These totals include nondisadvantaged students in the sample, as well as those classified as disadvantaged or advantaged.

than 4 credits. Only 10 percent of the high achievers earned more than 6 credits in vocational courses.

Student characteristics, including race/ethnicity, gender, and age, affected the amount of vocational education taken by low- and high-achieving students in somewhat different ways (see table 3.5). Among low-achieving students, whites earned more credits (4.62) and spent a greater share of their time (24.11 percent) in vocational education than students in other racial and ethnic groups. Conversely, among high-achieving students, blacks earned more credits (3.15) and spent a greater share of their time (13.18 percent) in vocational education than other

Table 3.5

Credits Earned in Vocational Education by Disadvantaged and Advantaged Students, by Student Characteristics

Student Characteristic	Academic			
	Disadvantaged		Advantaged	
	Average Number of Credits	Percentage of All Credits	Average Number of Credits	Percentage of All Credits
Race/ethnicity				
White	4.62	24.11%	3.05	12.52%
Black	4.17	22.30	3.15	13.18
Hispanic	3.61	19.45	3.05	12.43
Other	4.03	21.74	2.35	9.66
Sex				
Male	4.42	23.49	3.08	12.51
Female	4.34	22.95	2.97	12.28
Age in 12th grade				
19 or older	4.42	24.76	3.57	15.17
18	4.39	23.10	3.08	12.63
17	4.36	22.50	2.84	11.65
16 or less	a/	a/	a/	a/

SOURCE: 1987 High School Transcript Study.

a/ Insufficient cell sizes.

students. Among low-achieving students, Hispanics spent less time (19.45 percent of their time in high school) in vocational courses than any other group, whereas among high achievers, students of other ethnicities (Native Americans, Asians, Pacific Islanders, and Alaskan Natives) spent the least amount of their time (9.66 percent) in vocational courses.

In both groups, males earned slightly more credits in vocational courses and spent slightly more of their high school time in these courses than did females. In addition, older students in both groups spent slightly more of their time and earned more credits in vocational courses than did younger students. Age appears to have had a greater effect on vocational enrollments among high achievers than it did among low achievers. The difference between 17- and 19-year-olds in this group, on average, was +0.73 credit, versus +0.06 credit for low-achieving students.

ENROLLMENT IN HIGH-QUALITY VOCATIONAL PROGRAMS

The Perkins Act places special emphasis on the issue of quality in vocational education and pays particular attention to the need for ensuring that students with special needs have access to high-quality programs along with whatever support services may be necessary to help such students succeed in those vocational programs. Thus, the most important question to be addressed in an analysis of disadvantaged students' vocational enrollment patterns is the quality of the vocational education courses they take in high school. Is the vocational education they take likely to improve their postschool entry into the labor force or enrollment in further training? Is it likely to help them enter a field with a reasonable career path? In this section, we investigate the issue of the quality of the vocational education in which disadvantaged secondary students enroll.

Although data on posthigh school outcomes are not available for students in HSTS and thus cannot be used as indicators of the quality of their vocational programs, some indirect measures of quality are available. These include the location of vocational courses, enrollment in specific labor market preparation, along with matriculation in a sequenced *program* of studies, enrollment in cooperative education or paid work experience, and training in service occupations. In this section, we present findings on each of these topics. (Some additional indirect measures of the quality of vocational programs are defined and used in the section of

this chapter on school characteristics.) The analysis compares the vocational programs of academically disadvantaged students with the programs of their high-achieving peers.

Location of Vocational Courses

Area vocational schools are generally thought to provide higher quality occupationally specific vocational education than comprehensive high schools. In part because they serve multiple schools or districts, area vocational schools often have relatively more resources for purchasing up-to-date equipment and materials than may be available to comprehensive schools. Furthermore, they often are able to provide more choices in terms of intensive, occupationally specific programs of study in areas like trades and industry or technical fields, which may improve students' chances of entering jobs with career paths. One indicator of quality, therefore, is the proportion of all vocational credits earned by students in courses taught at area vocational schools and other off-campus locations.[30]

Our findings on course location represent the experience of the typical student nationwide. In this connection, it is important to note that not all students in the nation have access to an area vocational school. Area vocational schools were available at 52.8 percent of schools in the HSTS sample.

As shown in table 3.6, most students took their vocational education in their home high school, with low-achieving students taking 79 percent of their vocational credits at that location, compared with 89 percent of the vocational credits earned by their high-achieving peers. On average, academically disadvantaged students were more than twice as likely as

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[30]Data reported on course location are lower-bound estimates of the credits earned in area schools. First, to the extent that an area school becomes a student's school of record, such students would not have been available for selection in the HSTS sample, in which eligible schools were limited to comprehensive high schools. Second, in some places particular courses are available in more than one school (e.g., both the home school and the area vocational school). If the location of a particular course taken by a particular student could not be determined, it was coded in the "other" category. Thus the incidence of credits earned in area vocational schools is somewhat underestimated, but because all courses were coded uniformly, the patterns reflected in the analyses can be viewed with confidence.

Table 3.6

Location of Students' Vocational Courses, as a Percentage of All Credits Earned in Vocational Education

Students	Course Location			Total
	Home High School	Area Vocational School	All Other Locations	
Disadvantaged	79.27%	12.53%	8.20%	100.00
Advantaged	89.35	5.84	4.80	100.00

SOURCE: 1987 High School Transcript Study.

advantaged students to attend an area vocational school (13 percent versus 6 percent of all vocational credits).

Among disadvantaged students, patterns of attendance at area vocational schools varied considerably by the number of credits students earned in vocational education (table 3.7). Students earning relatively few credits in vocational courses were unlikely to attend an area school, with less than 4 percent of their average 1.20 credits earned in that location. Students who earned more than 5 credits in vocational courses, on the other hand, were much more likely to attend area schools, earning 16 percent of all vocational credits at those institutions. On average, these students, who might be called vocational concentrators, earned 7.46 credits in vocational education and represented about 36 percent of academically disadvantaged students.

Patterns of attendance at area vocational schools also varied according to gender and race/ethnicity. Males were more likely than females to enroll in courses at area vocational schools (15 percent versus 9 percent of all credits in vocational education), probably because more of the courses at those schools are in the male-dominated trades and industry programs.

Table 3.7

Location of Disadvantaged Students' Vocational Courses by Range of Credits Earned in Vocational Education, Gender, and Race/Ethnicity

Students	Course Location			Average Number of Credits in Vocational Education
	Home High School	Area Vocational School	All Other Locations	
Number of vocational credits				
0.0 - 2.00	91.96%	3.40%	4.64%	1.20
2.01 - 5.00	86.13	7.67	6.20	3.70
>5.00	74.15	16.17	9.68	7.46
Gender				
Male	75.86	14.86	9.27	4.42
Female	84.49	8.95	6.57	4.34
Race/ethnicity				
White	79.19	13.39	7.42	4.62
Black	79.07	11.52	9.40	4.17
Hispanic	82.70	5.68	11.62	3.61
Other	71.78	18.59	9.63	4.03

SOURCE: 1987 High School Transcript Study.

Hispanic students, who averaged fewer credits in vocational courses than students of other ethnicities, were much less likely to enroll at area schools. Black students were slightly less likely than whites (12 percent versus 13 percent) and somewhat less likely than students of

other ethnicities (Asians, Native Americans, and Pacific Islanders) (12 percent versus 19 percent of all vocational credits) to enroll in courses at area schools.

Specific Labor Market Preparation

Research on vocational education suggests that completion of a program of specific labor market preparation improves the employment prospects of high school students.[31] "Specific labor market preparation" includes vocational courses in skill areas (e.g., welding, secretarial work, graphics), the completion of which should permit a student to obtain a training-related job or further training in that skill area. Conversely, "general labor market preparation" includes introductory courses, such as general industrial arts, vocational mathematics, and some work experience, that impart skills and behaviors thought useful in most types of jobs and at the same time permit students to explore career concepts prior to selecting a specific skill area for concentrated training.[32]

As one aspect of our analysis of the quality of the vocational courses in which disadvantaged students enroll, we examined their patterns of participation in occupationally specific courses. In this context, "pattern" is defined as a sequenced set of courses in a specific skill area.

As reported in table 3.8, disadvantaged students, on average, earned a higher proportion of their vocational credits in specific labor market preparation than did advantaged students, although the difference was not large (68 percent versus 64 percent). In addition, the proportion of all vocational credits earned in a second or later course--indicating pursuit of a vocational sequence or program--was somewhat higher. More than 22 percent of credits

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[31]J. H. Bishop, "Occupationally Specific Training in High School," in G. H. Copa, J. Plihal, and M. A. Johnson, (eds.), *Revisioning Vocational Education in the Secondary School* (St. Paul, MN.: University of Minnesota, Minnesota Research and Development Center for Vocational Education, 1986).

[32]The other broad category of vocational courses is consumer and homemaking education, which in some ways crosses these categories, but also includes courses that are not related to the workplace, and thus is reported separately throughout these analyses.

Table 3.8

Enrollment of Disadvantaged and Advantaged Students in General and Specific Labor Market Preparation, as a Percentage of Total Credits in Vocational Education

Vocational Area	Percentage of All Vocational Credits	
	Disadvantaged Students	Advantaged Students
Consumer & Homemaking Education	13.90%	11.30%
General Labor Market	18.22	25.25
Specific Labor Market	67.88	63.46
First course in a sequence	41.69	41.20
Second or later course	22.32	16.94
Nonsequential course	3.87	4.98
Total	100.00	100.01
Average Number of Credits in Vocational Education	4.39	3.01

SOURCE: 1987 High School Transcript Study.

earned by disadvantaged students in vocational courses were in advanced courses, as opposed to less than 17 percent of credits earned by advantaged students (some of this difference can be explained by the fact that disadvantaged students took more credits in vocational education in total than did advantaged students). Thus, while low-achieving students earned more credits overall in occupationally specific courses and more credits in advanced courses than high achievers, the relatively low number of credits earned by any students in advanced courses suggests that few students in either group appeared to be pursuing a real vocational *program* that could be expected to prepare them for a good entry-level job.

Race/ethnicity and gender differences affected disadvantaged students' patterns of course-taking in specific labor market preparation (table 3.9). Disadvantaged white students earned a somewhat higher proportion (69 percent) of their vocational credits in specific labor market preparation than did students in other groups, and black students earned the lowest proportion of all ethnic groups (62 percent), but the differences were not large. The disparity in proportion of credits earned in occupationally specific courses was more striking by gender than by race/ethnicity. Low-achieving male students earned a considerably higher proportion of their vocational credits in occupationally specific courses than did females (75 percent versus 57 percent of all vocational credits).[33] To the extent that specific labor market preparation provides students with improved opportunities for good entry-level jobs, then, it appears that males have considerably better options than do females at the high school level.

As would be expected, students' enrollment in occupationally specific vocational *subjects* also differed markedly by academic achievement levels and by gender (table 3.10). Low-achieving males earned a considerably higher proportion of their specific labor market credits in trades and industry than did high-achieving males (63 percent versus 43 percent). In addition, they earned a lower proportion of occupationally specific credits in business and office and a slightly lower proportion in agriculture. High-achieving males, in contrast, were more than five times as likely as low-achieving males to earn credits in the field of technical/communications. This finding is important, given the emphasis in the Perkins Act on training for high-technology fields. Our data suggest that enrollment of low-achieving males in high-technology fields occurs infrequently.

Disadvantaged females enrolled in technical/communications courses less frequently than any other group. In fact, their high-achieving female classmates were about five times as

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[33]Comparable percentages for male and female high-achieving students were 71 and 58 percent, respectively. Thus although the pattern of gender disparity in occupationally specific courses was in the same direction, it was somewhat less marked for academically advantaged than for disadvantaged students.

Table 3.9

Credits Earned by Academically Disadvantaged Students in Specific Labor Market Preparation, by Student Characteristics

Student Characteristic	Average Number of Credits	Percentage of All Vocational Education
Gender		
Male	3.32	75.11%
Female	2.47	56.91
Race/ethnicity		
White	3.21	69.48
Black	2.59	62.11
Hispanic	2.36	65.37
Other	2.76	68.49

SOURCE: 1987 High School Transcript Study.

likely to earn credits in these courses, and their high-achieving male classmates were nearly six times as likely. The proportion of disadvantaged females' occupationally specific credits in business and office, a field traditionally popular with females, was somewhat lower than that of academically advantaged females, and their enrollment in trades and industry, a traditionally male-dominated field, was about the same as that of high-achieving females. Perhaps most striking is the proportion of their time spent in occupational home economics, which includes a variety of service-related courses as well as other traditional "female" fields. Low-achieving females were twice as likely to enroll in such courses as high-achieving females and nearly eight times as likely to spend time in occupational home economics courses as their disadvantaged male counterparts. Finally, disadvantaged females were considerably more likely than any other group to spend time in marketing and distribution. These patterns suggest the

Table 3.10

Average Enrollment in Vocational Subjects by Student Gender and Achievement Level, as a Percentage of Credits Earned in Specific Labor Market (SLM) Preparation

Subject	Disadvantaged		Advantaged	
	Male Percentage of SLM	Female Percentage of SLM	Male Percentage of SLM	Female Percentage of SLM
Agriculture	7.23%	2.83%	10.55%	1.16
Business & office	12.35	50.61	22.48	59.30
Marketing	3.92	8.50	1.83	3.49
Health	.60	4.05	1.38	2.33
Occupational home economics	2.41	16.60	1.83	6.98
Trades & industry	63.25	8.50	42.66	8.14
Technical/communications	4.22	3.24	18.81	15.70
Other	5.72	5.26	0.92	2.91
Total[a/]	100.00	100.00	100.00	100.00
Average number of credits in SLM	3.32	2.47	2.18	1.72

SOURCE: 1987 High School Transcript Study.

a/ Numbers do not sum to 100 percent due to rounding.

need for attention to the vocational training needs of disadvantaged females, and particularly to the expansion of their access to programs with higher career potential than those in which they currently enroll.

This finding is supported by other analyses conducted for NAVE that focus on the influence of socioeconomic status (SES) rather than academic disadvantagement on sex

stereotyping in vocational education. Using data from the sophomore cohort of HS&B, Hotchkiss found that gender differences in the average credits of occupationally specific vocational education earned in the last two years of high school by students depended strongly on socioeconomic status.[34] Analysis of enrollment patterns in consumer and homemaking, business support, trades and industry, and vocational agriculture revealed that differences in course-taking patterns by gender are significantly higher among low-SES than high-SES students in all four of these categories of vocational education. The differences also held for vocational education overall, where sex differences in the average credits of all vocational education taken by students declined in direct relation to increasing socioeconomic status.[35] In contrast, gender differences among blacks, whites, and Hispanics were generally the same across socioeconomic statuses.

Work-Based Courses[36]

Recent research on the effects of secondary vocational education indicates that paid work experience can facilitate students' transition from school to work. Brailsford,[37] for example, found that students who completed a cooperative education sequence as part of their vocational program experienced lower rates of unemployment, found a full-time job more quickly, were more likely to enter a training-related job, experienced more frequent raises, and expressed more job satisfaction. Winer and Kane and Foster, et al. reported that

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[34] Larry Hotchkiss, *Access to Quality Vocational Education*, NAVE Contractor Report (Washington, DC: Decision Resources Corporation, 1989).

[35]The study found few gender stereotyping patterns by race/ethnicity.

[36]"Work-based courses" are defined as those courses with a formal work component for which students earn high school credit toward graduation. Thus, the term does not include part-time or summer jobs for which students do not earn credit.

[37]Amelia T. Brailsford, *The Effectiveness of Cooperative Education* (Columbia, SC: South Carolina State Department of Education, 1982).

cooperative education increases the longevity of the first job and increases job satisfaction.[38] Finally, a number of studies have reported that paid work experience facilitates development of employability skills and students' self-confidence in dealing with work-related problems.[39] Because of these benefits of paid work experience, particularly cooperative education, we hypothesized that participation in competitive[40] work during high school is one indicator of high-quality vocational education.

In most localities, high school students have the option of enrolling and earning credits in one of several types of work-based courses, including cooperative education, paid work experience, and unpaid work study. In terms of vocational preparation, cooperative education is the most rigorous of the three. Cooperative education students work during their last year (or sometimes their last three semesters) of high school at a paid, competitive job in the occupational field in which they received training during high school. The program has a classroom component, in which students work on employability and other skills. It also includes a formal contract among the student, school, and employer, with the employer participating in evaluation of the student's job performance. The cooperative education

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[38]Ellen N. Winer and Stephen M. Kane, "Employer Evaluation of High School Work Experience Programs," *Journal of Cooperative Education*, 20(1) (1983): 35-44; David E. Foster, et al., "Knowledge Acquired in a Program for Building Employability Skills," *Journal of Employment Counseling*, 23(4) (1986): 176-177.

[39] Edwin L. Herr, et al., "Heterogeneity in a Changing Work Force and in the Emerging Purposes of Cooperative Education," *Journal of Cooperative Education*, 22(2) (1986): 26-38; Cynthia Parsons, *The Bridge: Cooperative Education for All High School Students* (Working Paper for the William T. Grant Foundation Commission on Work, Family and Citizenship, 1987); Becky J. Hayward, et al., *Exemplary Secondary Vocational Education*, 1988; Morgan V. Lewis and Jeannette L. Fraser, *Increasing Community Involvement in Cooperative Vocational Education* (Columbus, OH: Ohio State University, National Center for Research in Vocational Education, 1982). Some researchers have concluded, however, that work experience may be of less benefit to disadvantaged students, whose academic deficits may preclude access to cooperative education and who may be more likely to be placed in low-skill, low-paying jobs (Frederick G. Welch and Michael Erwin, *The Co-op/Disadvantaged Job Success Project. Final Report. Vocational-Technical Education Research Report* (University Park, PA: Pennsylvania State University, 1986).

[40]As opposed to sheltered or subsidized work.

coordinator visits each student's place of employment and monitors performance, thus serving as a supervisor-mentor while students learn *how* to work, along with honing the skills they have learned in the classroom and shop. Thus cooperative education is in some sense the capstone of a secondary vocational program, providing students a transitional period when they retain the supports that characterize the school environment while beginning their adjustment to adult jobs and responsibilities.

Credit-bearing paid work experience involves work at a competitive job that may or may not be related to any vocational courses students are taking. It has the advantage of enabling students to work for pay and for credit during their high school years but, unlike cooperative education, it is not typically the capstone of an occupationally specific vocational *program*. The extent and type of teacher supervision that students receive probably vary widely from district to district around the country. (Student transcripts do not provide information to permit analysis of this issue, although the paid work experience included in this analysis is limited to courses for which students are earning credit, which implies supervision.)

Unpaid work study includes arrangements in which students receive high school credit for working at "volunteer" jobs that are generally, though not always, at the school (office aide, cafeteria worker). While such jobs may teach employability skills, they do not provide students with much experience in the types of work environments they will likely enter as adults.

Analysis of data from HSTS shows that relatively few of the vocational credits that students earned in high school were in work-based courses, although the proportion of their work-based course credits that included paid work was somewhat higher for disadvantaged (69 percent) than for advantaged students 59 percent) (table 3.11). About 10 percent of the vocational credits earned by low-achieving students were in these courses. Of the 0.44 credit earned in work-based courses of any type, 37 percent was in cooperative education, 33 percent in paid work experience, and 30 percent in unpaid work study. High achievers earned about

one-half as many credits in work-related courses (a total of 0.22 credit, on average), but the distribution across the three types of work experience was somewhat different. High achievers earned more credits in cooperative education (43 percent of all work-related credits), considerably less in paid work experience (16 percent), and more in unpaid work study (41 percent).

Table 3.11

Average Number of Credits Earned by Disadvantaged and Advantaged Students in Work-Based Courses

	Disadvantaged Students		Advantaged Students	
Type of Course	Average Number of Credits	Percentage of All Work-Based Courses	Average Number of Credits	Percentage of All Work-Based Courses
Cooperative education	0.16	36.57%	0.09	42.94%
Paid work experience	0.15	33.02	0.03	16.05
Unpaid work study	0.14	30.41	0.09	41.00
Total	0.44	100.00	0.22	100.00
Average number of credits in vocational education	4.39	--	3.01	--
Work-based courses as a percentage of all vocational education	--	10.11	--	7.21

SOURCE: 1987 High School Transcript Study.

The number of credits, as well as the percentage of all their vocational credits, earned by low-achieving students in work-based courses varied across student gender and race/ethnicity (table 3.12). Females earned a slightly higher share of all vocational credits in

Table 3.12

Percentage of Credits in Work-Based Courses Earned by Disadvantaged Students, by Student Characteristics

Student Characteristic	Percentage of All Work-Based Courses			Percentage of All Vocational Education
	Cooperative Education	Paid Work Experience	Unpaid Work Study	
Gender				
Male	29.94%	39.98%	30.07%	9.60%
Female	45.49	23.64	30.87	10.95
Race/ethnicity				
White	36.56	36.90	27.54	9.07
Black	40.26	24.16	35.58	12.88
Hispanic	41.22	27.34	31.44	13.94
Other	35.44	26.45	38.11	13.09

SOURCE: 1987 High School Transcript Study.

work-related courses. They were considerably more likely to earn credits in cooperative education than were male students (46 percent versus 30 percent of all work-based credits) and were less likely to earn credits in paid work experience (24 percent versus 40 percent).

On average, white students spent proportionately less time in work-based courses (9 percent) than did students of other ethnicities, while Hispanics spent the most (14 percent). White students earned fewer credits in unpaid work study, while black students and students in other ethnic groups earned proportionately more credits in unpaid work study (28 percent versus 36 and 38 percent, respectively). White students also earned proportionately fewer credits in cooperative education but more in paid work experience. Hispanic and black students earned more credits in cooperative education than did other students. Overall, though, work-based courses did not play a significant role in the vocational programs of

disadvantaged high school students, with no group of students averaging more than around one-half credit in these courses.

Training in Service Occupations[41]

One of the concerns of vocational education policymakers and practitioners is that students with special needs, including academically or economically disadvantaged students, students with handicaps, and others, tend to be relegated to service fields such as food service, child or geriatric care, or janitorial services that lead to low-paying, dead-end jobs. As one component of our analysis of the access that disadvantaged students have to high-quality vocational programs, we investigated the extent to which these students earn credits in service occupations. Included in this category of vocational education is training for food service; building maintenance; household, lodging, personal or protective services; and cosmetology, among others.

The transcript data indicate that relatively few of the vocational credits earned by low-achieving students were in training for service-related occupations, although the average earned in these fields by disadvantaged students was more than twice as high as that of high achievers (0.60 credit versus 0.29 credit). Overall, nearly 14 percent of vocational credits earned by disadvantaged students were in service-related occupations, while less than 10 percent of vocational credits earned by advantaged students were in this area (table 13). Both groups earned more credits in training for household services (0.26 and 0.17, respectively) than they did in any other type of service occupation training.[42] Household training represented 44 percent of the service occupation credits of disadvantaged students and 60 percent of service occupations credits earned by advantaged students. In addition, disadvantaged students earned 0.17 credit, or 28 percent of their service occupation credits, in food services.

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[41]Information on the basis for this analysis is presented in appendix B.

[42]Household services includes occupations concerned with tasks in and around a private household (e.g., child care).

Table 3.13

Average Credits Earned by Disadvantaged and Advantaged Students in Training for Service Occupations

Type of Course	Disadvantaged Students		Advantaged Students	
	Average Number of Credits	Percentage of All Service Occupations	Average Number of Credits	Percentage of All Service Occupations
Apparel	0.04	6.22	0.02	7.97
Building maintenance	<0.01	0.75	0.00	0.00
Cosmetology	0.08	13.86	0.03	9.54
Food	0.17	27.72	0.04	15.52
Health	0.04	6.89	0.02	7.25
Household	0.26	44.00	0.17	59.72
Lodging	<0.01	0.30	0.00	0.00
Personal service	0.00	0.00	0.00	0.00
Protective service	0.00	0.00	0.00	0.00
Recreation	<0.01	0.27	0.00	0.00
Total	0.60	100.00	0.29	100.00
Average number of credits in vocational education	4.39	--	3.01	--
Training in service occupations as a percentage of all vocational education	--	13.63	--	9.57

SOURCE: 1987 High School Transcript Study.

Enrollment in training for service occupations varied by student characteristics (table 3.14). Perhaps most striking was the difference in enrollment patterns by gender, with

Table 3.14

Credits Earned by Disadvantaged Students in Training for Service Occupations, by Student Characteristics

Student Characteristic	Average Number of Credits	Percentage of All Vocational Education
Sex		
Male	0.26	5.84%
Female	1.11	25.60
Race/ethnicity		
White	0.55	11.84
Black	0.88	21.16
Hispanic	0.40	11.18
Other	0.48	11.99

SOURCE: 1987 High School Transcript Study.

low-achieving females earning nearly 26 percent of all their vocational credits in services. Among their male counterparts, the average was less than 6 percent of all vocational credits. Comparable percentages for high achievers were 3 percent for males and 14 percent for females. Overall, then, both groups of females earned substantially more credits in these occupations than their male counterparts, a finding that reinforces other findings in this chapter on the continuing influence of achievement and gender on students' vocational training choices in high school.

Low-achieving black students earned a considerably higher proportion of their vocational credits in training for service occupations courses than did low-achieving students of other ethnicities. More than 21 percent of their vocational credits were in these courses, compared with 11 percent for Hispanic students and 12 percent for whites and students in

other ethnic groups. Although, on average, disadvantaged students did not spend a large amount of their time in training for service occupations, females and black students spent considerably more time in such courses, which do not promise much economic return once the students enter the labor force.

Programs of Study

One way to view the implications of these findings for program quality is to consider how the various factors--course location, specific labor market preparation, enrollment in work-based courses or training in service occupations versus other fields--fit together. That is, to what extent can we determine the quality of the vocational *programs* of disadvantaged students? In what ways do their programs differ from those of their advantaged peers? Tables 3.15 and 3.16 summarize information on the vocational programs of academically disadvantaged and advantaged males and females in order to provide a picture of the vocational programs of typical students in each of these groups. We have selected gender as a differentiating characteristic because for all students it continues to have an important influence on the types of vocational courses in which they enroll and the amounts of credits they earn in various occupational areas.

As shown in table 3.15, low-achieving males were more than twice as likely as high achievers to earn vocational credits at an area vocational school. They were also considerably more likely to earn credits in work-based courses and earned a somewhat higher proportion of their vocational credits in occupationally specific courses (75 percent versus 71 percent). Nearly half of the vocational credits earned by academically disadvantaged males were in trades and industry, compared with 30 percent of credits earned by high achievers. Academically advantaged males were four times as likely as low achievers to earn credits in technical and communications areas, which include many of the programs currently referred to as "high tech," like electronic technology and computer programming. High-achieving males

Table 3.15

Summary Characteristics of the Vocational Programs of Disadvantaged and Advantaged Male Students (Percentage of all Vocational Credits)

Vocational Program Characteristics	Disadvantaged Males[a/]	Advantaged Males[a/]
Courses at area vocational schools	14.86%	6.42
Courses in consumer & homemaking education	7.92	5.19
Work-based courses	9.60	3.90
Courses in specific labor market preparation	75.07[a/]	70.93[a/]
Services	5.84	3.10
Business & office	9.29	16.06
Trades & industry	47.53	30.18
Technical & communications	3.22	13.32
Average number of credits in vocational education	4.42	3.08

SOURCE: 1987 High School Transcript Study.

a/ Columns do not add to total because of overlapping categories.

also earned a greater share of their vocational credits in business and office, which includes a variety of management courses.

The picture with respect to the quality of vocational education for disadvantaged males is somewhat mixed. Although low-achieving males took more courses at area vocational

Table 3.16

Summary Characteristics of the Vocational Programs of Disadvantaged and Advantaged Female Students (Percentage of all Vocational Credits)

Vocational Program Characteristics	Disadvantaged Females	Advantaged Females
Courses at area vocational schools	8.95%	5.45%
Courses in consumer & homemaking education	23.27	15.49
Work-based courses	10.95	9.47
Courses in specific labor market preparation	56.91[a/]	58.08[a/]
Services	25.60	13.97
Business & office	28.93	34.35
Trades & industry	4.91	4.85
Technical & communications	1.87	9.15
Average number of credits in vocational education	4.34	2.97

SOURCE: 1987 High School Transcript Study.

a/ Columns do not add to total percent because of overlapping categories.

schools and earned more credits in specific labor market preparation than high-achieving males, the latter took vocational courses (technical fields and business management, in particular) with greater career potential. Even so, academically disadvantaged males appear

to have had considerably better quality high school vocational education than did low-achieving females (table 3.16).

Academically disadvantaged females were less likely than their male counterparts to attend area vocational schools (9 percent versus 15 percent of all vocational credits they earned); they took nearly one-fourth of their vocational credits in consumer and homemaking, and they earned a considerably lower proportion of credits in occupationally specific courses (table 3.16). They took very few technical and communications or trades and industry courses. Rather, they tended to enroll in business and office (29 percent of all their vocational credits) and service-related courses (26 percent). High-achieving females took a slightly higher proportion of occupationally specific courses and earned a greater share of their credits in business and office and technical and communications fields.

Overall, these analyses suggest that the quality of vocational education for disadvantaged females is problematic. They took fewer occupationally specific courses than any other group and spent less time than their male counterparts at area vocational schools. Further, with the exception of business and office occupations, their vocational credits were not in fields that could be expected to offer much labor market return. Further, their consumer and homemaking courses represented a considerably higher proportion of their vocational credits than these courses did for other groups of students.

The gender specificity of all students' programs is apparent in the information synthesized in tables 3.15 and 3.16. Females took consumer and homemaking, services, business and office courses. Males took trades and industry. High-achieving males also took some business, and high-achieving males and females enrolled in technical and communications fields. In summary, the data suggest that low-achieving males, who took a much higher proportion of credits in specific labor market preparation, had better prospects for economic return than did low-achieving females, who, with the exception of business and office courses, were taking vocational courses that do not appear to have much career potential.

SCHOOL-LEVEL EFFECTS ON ACCESS TO HIGH-QUALITY VOCATIONAL EDUCATION

A key issue in examining the quality of vocational education for students is the influence of the schools they attend on their access to high-quality vocational programs. This section analyzes the effects of school-level characteristics, including student poverty and academic achievement, on the access of disadvantaged students to high-quality vocational education. Available measures of program quality are used to compare the breadth and depth of vocational offerings in schools with high concentrations of disadvantaged students to the offerings in schools with low concentrations of disadvantaged students. The findings provide insight into issues of the extent to which federal resources for improving the quality of vocational education should be targeted on schools with large concentrations of disadvantaged students.

Definition of the Quality of Vocational Education

The quality of vocational education offered by a school is measured along three dimensions. The first dimension is the possibility of enrolling in three different kinds of specialized vocational programs: an area vocational center, a program of cooperative education, and a program of work study. The presumed benefits of enrolling in work-based programs and area vocational facilities were discussed previously. Schools with access to an area vocational center are usually able to provide students with a significantly wider range of advanced courses and better-equipped classrooms and shop facilities than schools without such access.

A second dimension of quality is the breadth of vocational offerings in the school. One measure of the breadth of vocational offerings is the total number of vocational courses offered to students by the school. Presumably, a larger number of courses means more choice for students among alternatives. Two other variables used to measure the breadth of offerings include the number of vocational program areas in which more than one or more than three

occupationally specific courses are offered. As described in the Secondary School Course Taxonomy (SST) developed by NAVE,[43] the vocational curriculum consists of eight program areas: agriculture, business and office (consisting of business support and business management), marketing, health, occupational home economics, trades and industry, technical and communications, and "other."

The third dimension is the depth of a school's offerings. Depth of offerings is defined as the total number of credits or courses offered "at the second level or above," as classified in the SST. "Second level and above" courses are the advanced courses in a sequence of occupationally specific courses.

For purposes of the analysis, schools were divided into quartiles according to three measures of the disadvantaged status of the students enrolled: the average level of academic achievement in the school, the average family income of students in the school, and the average socioeconomic status (SES) of students in the school. (The data source used was the sophomore cohort of the HS&B survey). SES was measured with a composite variable of parents' education, parents' occupation, and number of siblings in the family. All schools in the HS&B sample were then assigned to quartiles on each of these three dimensions. Only public schools and only high school graduates were included in the analysis.

While our statistical analyses were conducted on the entire sample of public schools, for presentation of the results, four groups of schools were selected: schools in the *lowest* quartile of all three variables of academic achievement, income, and socioeconomic status; schools in the *second* quartile of the same three variables; schools in the *third* quartile; and schools in the *upper* quartile. The percentages of all schools in the sample by quartile of academic achievement and income are shown in table 3.17. The schools selected for the presentation of results appear in bold type.

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[43]National Assessment of Vocational Education, *First Interim Report.*

Table 3.17

Percentage of Schools by Quartile of
Average Academic Ability and Family Income

Average Family Income for the School	Average Academic Ability for the School: Low	Medium Low	Medium High	High	All Levels
Low	**0.11**	0.03	0.05	0.03	0.23
Medium low	0.06	**0.07**	0.04	0.07	0.24
Medium high	0.04	0.10	**0.06**	0.06	0.27
High	0.01	0.05	0.08	**0.13**	0.26
All Levels	0.23	0.24	0.23	0.30	1.00

SOURCE: High School and Beyond Survey, Sophomore Cohort.

NOTE: Numbers do not sum due to rounding.

After the schools were grouped into quartiles based on the three measures of disadvantaged status, multiple regression analysis was used to estimate the effects of school disadvantage on the availability of high-quality vocational education. The outcome variables of the regression were the school-level measures of the quality of vocational education. The independent variables in the analysis were the three measures of school disadvantaged status (first, second, third, or fourth quartile on each measure); as well as region of the country (Northeast, Central, South, and West); urbanicity (rural, urban, or suburban); and school size (total number of students).

Quality of Vocational Education

The main conclusion of this analysis is that the quality of the vocational education offered is related to the concentration of socioeconomically and academically disadvantaged

students in a school. This finding is summarized in table 3.18. Generally speaking, the quality of vocational education is highest in schools that are in the midrange of academic ability, family income, and SES, and lowest in schools with the highest concentration of disadvantaged students.

One of the most noteworthy findings is that schools with high concentrations of disadvantaged students have the least access to an area vocational facility. Approximately 75 percent of schools in the two midrange groups have access to an area vocational school, compared with 45 percent of schools with the highest concentration of disadvantaged students and 65 percent of schools in the most advantaged group. In other words, students in the most disadvantaged schools have approximately 40 percent less access to an area vocational school than students in the two middle groups of schools. The average for all schools was 64 percent. The relationship between school characteristics and access to cooperative education is not nearly so strong or consistent: 59 and 68 percent of schools in the two middle groups of schools offer cooperative education, compared with 55 percent in the most disadvantaged group and 57 percent in the most advantaged group. No simple relationship between school disadvantage and the presence of a work-study program in a school is apparent.

School disadvantage also affects the breadth of access to high-quality vocational education. Schools in the next to highest group of schools offer an average of 19.6 more credits of vocational education than schools in the most disadvantaged group and 2.3 credits more than schools in the most advantaged group. The total number of courses offered in the most disadvantaged schools is again 40 percent less than in the group of schools where the number of courses is the highest. Similar relationships hold for the average number of program areas in which more than one course is offered and more than three courses are offered. Schools in the next to highest group offer more than one course in 5.3 program areas and more than three courses in three program areas. In comparison, the most disadvantaged

Table 3.18

Estimated Quality of Vocational Education by School Level
Concentration of Disadvantaged Students

School/Program Characteristics	Highly Disadvantaged	Medium Disadvantaged	Medium Advantaged	Highly Advantaged
Percentage of schools that offer:				
Area vocational center	45.2%	74.0%	74.9%	64.7%
Cooperative education	55.1	68.2	58.7	57.0
Work-study	58.6	50.3	71.0	66.8
Levels of vocational education offered				
Total no. of credits offered (all courses)	29.14	36.52	48.75	46.44
Program areas with at least 1 course	3.55	4.53	5.34	5.27
Program areas with at least 3 courses	2.36	2.72	3.29	3.30
No. of credits at 2nd level or above	7.73	11.26	12.79	14.80
Vocational course enrollments (no. of credits)				
General labor market preparation	1.28	1.16	1.13	0.83
Consumer and home economics	1.40	0.99	0.67	0.38
Occupationally specific	3.81	3.85	2.72	2.05
Amount in student's primary area	2.88	2.72	2.10	1.48
Total all types[a/]	6.49	6.00	4.52	3.26
Percentage occupationally specific	58.7	64.2	58.9	62.9
Percentage in student's primary area[b/]	44.4	45.3	45.5	45.4
Academic course enrollments (no. of credits)				
Basic and remedial	5.19	4.42	4.87	5.31
Regular	6.16	7.52	8.42	10.13
Advanced and specialized	0.71	0.72	0.86	0.82
Total all types	12.06	12.66	14.15	16.26
All subject areas (no. of credits)				
Academic	12.06	12.66	14.15	16.26
Vocational	6.49	6.00	4.52	3.26
Personal/other	2.46	2.59	2.57	2.48
Total	21.01	21.25	21.24	22.00
Average school size (no. of students)	650	832	926	1042

SOURCE: High School and Beyond Survey, Sophomore Cohort.
NOTE: Degree of school disadvantage measured by quartiles of average family income, student academic ability, and socioeconomic status when region, urbanicity, and percent minority were held statistically constant. Highly disadvantaged status refers to schools that were in the lowest quartile of income, ability, and socioeconomic status. Schools classified as "highly advantaged" were in the highest quartile of family income, ability, and socioeconomic status. Results are for public schools only.

a/ Total includes general labor market preparation, consumer and home economics, and occupationally specific.
b/ Percentage of occupationally specific courses.

schools offer more than one course in 3.6 program areas and more than three courses in 2.9 program areas.[44]

The depth of courses offered exhibits a somewhat different pattern. Here, the most advantaged schools, instead of the next to highest group, offer the largest number of advanced, occupationally specific courses, with 14.8 credits in such courses, on average. This larger number of second-level advanced courses is offered in essentially the same number of total program areas in which more than one course and more than three courses are offered compared to the next highest group of schools. Each successively less advantaged group of schools offers fewer credits of second-level courses--12.79 credits the third group of schools, 11.26 credits in the second group, and 7.73 credits in the first or most disadvantaged group of schools. The same pattern is even reflected in the ratio of second level and above, or advanced, courses to program areas in which courses are offered. The ratio is 2.6 for the most advantaged schools and 2.2 for the least advantaged schools.

These results suggest that the students in schools with the lowest levels of achievement and SES income have the least choice among program alternatives and access to high-quality programs compared to students in all other groups of schools.

Total Credits of Vocational and Academic Courses Taken by Students

At the same time, students in the most disadvantaged schools earn significantly more credits in vocational education than students in the most advantaged schools, despite their relatively poorer choices. Table 3.18 shows the average number of credits earned in academic, vocational, and personal/other courses by students in the four groups of schools. The total number of credits taken by students in all subject areas increases slightly from 21.01 credits per student on average in the most disadvantaged schools to 22.00 credits in the most advantaged schools. The number of vocational credits within these totals nearly doubles, from

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[44]Note that rounded values are used to facilitate reading.

3.26 credits on average for the least disadvantaged schools to 6.49 credits for the most disadvantaged group of schools. Conversely, the number of academic credits taken by students increases from 16.26 credits per student in the least disadvantaged schools to 12.06 credits in the most disadvantaged ones. Therefore, the ratios of academic to vocational credits taken by the average student are 5 to 1 in the least disadvantaged schools and less than 2 to 1 in the most disadvantaged schools.

Strong school effects on the enrollments of students in vocational education are evident in these results. From other NAVE tabulations of the HS&B transcript data, the average amount of vocational education taken by academically disadvantaged students in all public schools is 5.03 credits.[45] This means that the *average student* in the most disadvantaged schools takes approximately *one credit more* of vocational education than the *average disadvantaged student* in all schools. This is a large difference. The average amount of vocational education taken by *disadvantaged students* in the schools with the highest concentration of disadvantaged students is therefore, in all likelihood, even greater than 6.49 credits.

The amount of vocational education taken by students in the most disadvantaged schools is in other respects no different from the amount taken by students in other schools. For instance, the amount of students' vocational course work that is concentrated in their primary areas is about 45 percent in all four groups of schools. Similarly, about 60 percent of the vocational courses students take in all four groups of schools is occupationally specific. By these two measures of quality, there are no differences among the four types of schools.

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[45]John Tuma and Antoinette G. Gifford, *Course Enrollment Patterns in Public Secondary Schools, 1969-1987*, NAVE Contractor Report (Berkeley, CA: MPR Associates, 1989). Academically disadvantaged students, representing 5.71 percent of the population, are defined as students having a grade point average of less than 1.5. Students with mostly C's or grade point averages between 1.5 and 2.6 (45.68 percent of the student population) take an average of 5.25 credits of vocational education before graduating. These figures are consistent with the average of 4.39 credits of vocational education taken by academically disadvantaged students, defined in this chapter as students whose grade point averages are below C (24.8 percent of the student population).

Effects of School Size on Quality

The differences among types of schools in the quality of the vocational education available to students shown in table 3.19 appear to result from two main factors: school disadvantagement and school size. As shown in table 3.18, schools in the most disadvantaged group are considerably smaller on average than schools in the least disadvantaged group.[46]

The effects of school disadvantagement on offerings can be analyzed separately from school size (table 3.19) by comparing the quality of offerings across types of schools for schools of a selected size. For example, the credits in advanced courses offered by schools with 500 students increased from 6.77 credits for the most disadvantaged schools to 8.32 credits for medium-disadvantaged schools, to 10.20 credits for the next most advantaged group of schools. The fact that vocational offerings increase so consistently for each incremental increase in the concentration of advantaged students implies a strong relationship between poverty, or resources per student available in the school, and the quality of vocational education available to students. All three measures of the breadth of course offerings exhibit a similar pattern: They increase steadily from the first (or most disadvantaged) group of schools to the third (or second to the most advantaged) group of schools and then decline for the most advantaged group. Depth of course offerings, on the other hand, continues to increase from the next-to-most advantaged to most advantaged groups of schools. Most likely, these patterns reflect larger proportions of college-bound students in the most advantaged compared to the next-to-most advantaged groups of schools.

The effects of size on offerings independent of the level of school disadvantagement are also strong, as seen by comparing values vertically in the columns of table 3.19 for each measure of quality. In every case, the estimated measure of the quality of offerings increases

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[46]The value of school size in table 3.18 was estimated from the HS&B data for the four different groups of schools using techniques of multiple regression. The independent variables of the regression were the quartiles of student achievement, income, and socioeconomic status, region, urbanicity, and percent minority, or the same variables as used in estimating the relationships for vocational offerings.

Table 3.19

Quality of Vocational Education by School-Level Concentration of Disadvantaged Students and Size

School/Program Characteristics	School Size	Disadvantaged		Advantaged	
		Highly	Medium	Medium	Highly
Percentage of schools offering:					
Area vocational center	500	39.3%	77.0%	66.3%	59.5%
	900	53.6	73.4	74.4	63.3
	1,300	68.0	69.9	82.5	67.1
Cooperative education	500	50.6	66.0	52.7	48.6
	900	62.4	68.7	57.3	54.8
	1,300	74.3	71.4	62.5	61.0
Levels of Vocational Education Offered					
Total number of credits offered (all courses)	500	24.42	27.42	42.82	33.76
	900	35.35	38.38	48.39	43.12
	1,300	45.28	49.35	53.95	52.47
Areas with at least 1 course	500	3.29	3.90	5.06	4.76
	900	3.99	4.66	5.32	5.14
	1,300	4.69	5.41	5.58	5.52
Areas with at least 3 courses	500	2.18	2.25	3.02	2.70
	900	2.66	2.81	3.27	3.14
	1,300	3.14	3.38	3.52	3.59
Credits at 2d level or above	500	6.77	8.32	10.20	10.60
	900	9.33	11.87	12.63	13.70
	1,300	11.88	15.41	15.05	16.80

SOURCE: High School and Beyond Survey, Sophomore Cohort.

with school size. This relationship is also consistent with a strong relationship between school resources and vocational offerings. Schools with few students can only afford to offer programs in a few areas with a limited number of advanced courses. As the number of

students increases, resources increase. The number of program areas in which courses can be offered, or the number of feasible advanced courses, can then be increased.

The independent effect of size is important to our analyses because, as shown in table 3.18 and as mentioned above, schools with high concentrations of disadvantaged students tend to be somewhat smaller than schools with low concentrations of disadvantaged students. The estimated national averages for high schools with different concentrations of disadvantaged students are 650 students for the most disadvantaged schools, 823 students for schools with a medium concentration of disadvantaged students, 926 students for schools with a medium concentration of advantaged students, and 1,042 students in the most advantaged schools.

The effects of disadvantagement on vocational offerings as shown in table 3.18 for the four groups of schools thus result from a combination of two effects: the effect of school size on offerings and the effect of school disadvantage on offerings. The overall conclusion is that the quality of vocational offerings is significantly lower in schools with the highest concentration of disadvantaged students than in schools with the lowest concentration of disadvantaged students. Furthermore, lack of resources is likely to be a major factor.

However, the effect of size on offerings is less direct than indicated in table 3.19. Students in the most disadvantaged schools take nearly twice as much vocational education as students in the least disadvantaged schools, thus offsetting their smaller size. In other words, even though schools with large concentrations of disadvantaged students tend to be smaller, the student contact hours of vocational education taught, and therefore the full-time equivalent student hours generated, are likely to be nearly the same as in the most advantaged schools. These offsetting effects essentially neutralize each other since the average size of less disadvantaged schools is nearly twice the average size of the more disadvantaged schools, while the amount of vocational education taken is about one half as much. This makes the finding of lower-quality offerings in schools with more disadvantaged students all the more significant.

School size is apparently related to the quality of vocational offerings but not through effects on the size of vocational programs.

CONCLUSIONS

The findings presented in this chapter shed light on issues of concern to policymakers and educators regarding disadvantaged students' participation in vocational education. In this section, we summarize some of our major conclusions and suggest issues that need further investigation in the context of high-quality secondary vocational education for this group of students with special needs.

What Are the Vocational Education Enrollment Patterns of Disadvantaged High School Students?

Nearly all students take at least some vocational education in high school. On average, disadvantaged students earn more credits--and spend proportionately more of their high school time--in vocational education than do advantaged students. Academically disadvantaged students earn more credits in vocational education (4.39) than do advantaged students (3.01 credits), and more than one-fourth of academically disadvantaged students earn more than 6 credits in vocational education during high school.

Enrollments in vocational education vary by student characteristics, including gender, race/ethnicity, and age. Male students earn more credits and spend more of their time in vocational courses than females. The same is true for disadvantaged white students, who spend 24 percent of their high school time in vocational courses, compared with 12 percent for their advantaged peers. Students who are over age for grade earn proportionately more of their high school credits in vocational education as well. Academically disadvantaged black students earn fewer vocational credits than whites but more than Hispanics or students in other ethnic groups. Among academically advantaged students, black students appear to earn slightly more credits and spend proportionately more of their time in vocational education than do other advantaged students.

Do Disadvantaged Students Have Access to High-Quality Vocational Programs?

In comparison with their advantaged peers, disadvantaged students earn more credits at area vocational schools, which tend to offer a broader range of vocational courses and programs than do comprehensive high schools. They also earn proportionately more of their credits in occupationally specific courses and in *coherent sequences* of vocational education. The fields they study, however, differ somewhat. Disadvantaged students are proportionately less likely to earn credits in such "high tech" fields as technical and communications programs, and they are less likely to earn credits in business and office occupations or vocational agriculture. Conversely, they enroll proportionately more frequently in trades and industry, marketing and distribution, and occupational home economics.

Disadvantaged students spend more of their vocational course-taking time in work-based courses, which are thought to teach students the employability skills they need to make a successful transition from school to work. However, less of this time is in cooperative education--the best of the work-based courses--than is true for advantaged students. They earn relatively few of their vocational credits in low-potential service occupations, although they earn proportionately more credits in these fields than do advantaged students.

Thus, the findings on quality are mixed. Disadvantaged students are enrolling in occupationally specific vocational *programs* more frequently than are their advantaged peers, but they are not always taking the courses or programs that can be expected to maximize their career potential. This finding, along with the finding that they earn considerably fewer academic credits and credits overall in high school, suggests the need to improve their enrollment in and completion of high-quality programs.

In What Ways Do Demographic Characteristics Affect the Types of Vocational Programs in Which Disadvantaged Students Enroll? Do These Characteristics Affect the Vocational Enrollments of Advantaged Students in Similar Ways?

Vocational enrollment patterns of disadvantaged students differ markedly by student gender; they also differ by student race/ethnicity, although these differences are somewhat less

pronounced. Disadvantaged females are less likely to attend an area vocational school than are their male peers. They spend considerably less of their vocational course-taking time in specific labor market preparation, and considerably more in consumer and home economics. Furthermore, they earn proportionately more credits in occupational home economics, almost none in trades and industry (a traditionally male-dominated field) and much more in business and office (a traditionally female-dominated field).

Differences in vocational course-taking among advantaged students by gender are similar to those that characterize disadvantaged students, although the differences are smaller. High-achieving females spend less time in occupationally specific courses, more time in business and office, and very little time in trades and industry or vocational agriculture. They do, however, spend roughly the same amount of time in high-tech courses as their male counterparts.

Black disadvantaged students spend proportionately less time in occupationally specific courses than any other group, although the differences across race/ethnicity are not nearly so large as they are between males and females. They spend more time in work-based courses than disadvantaged white students, but less than Hispanics or students of other ethnicities. They also spend considerably more of their time in service-related courses than any other group.

In What Ways Do School Characteristics Affect the Vocational Course-Taking Options of Disadvantaged and Advantaged Students?

Schools with high concentrations of disadvantaged students appear to offer significantly lower quality vocational education on average than do schools with concentrations of students in the midrange of academic ability, family income, and socioeconomic status and, in some cases also, schools with the highest achievement, income, and SES. Schools with higher concentrations of advantaged students offer about one-and-a-half times more access to area

vocational schools, total credits of vocational education, credits in advanced courses, and occupational areas in which three courses or more are offered.

Students in schools with high concentrations of disadvantaged students take about the same total number of credits before graduating from high school but considerably more of their credits are in vocational courses. This finding indicates the importance of the quality of vocational education provided to students in schools with high concentrations of disadvantaged students to the overall quality of their education. The differences among rich and poor schools in the total number of vocational credits taken by students are much larger than those found between advantaged and disadvantaged students in the student-level analysis, although some of this difference stems from the fact that the student-level analysis included some students who dropped out of school in their fourth year of high school.

The findings that both school size and degree of disadvantage are related to the quality of vocational programs emphasizes the importance of targeting federal resources on schools with high concentrations of poor and low-achieving students. These findings imply that the greatest needs for program improvement are generally in the most disadvantaged schools.

CHAPTER 4

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Information presented in previous chapters of this report provides details on the vocational enrollment patterns of handicapped and academically disadvantaged high school students. The comparisons we have presented between these patterns and the enrollment patterns of nonhandicapped and academically advantaged students permit us to make some inferences about the extent to which special needs students have access to the high-quality vocational education programs and activities called for in the Perkins Act. Further, review of these findings suggests some recommendations for strategies that may improve the vocational education experiences and outcomes of these groups of students.

In this chapter we provide a synthesis of the study's conclusions about handicapped and disadvantaged students' participation in secondary vocational education. This synthesis is followed by a series of recommendations that policymakers and practitioners may want to consider in the context of improving the capacity of the enterprise to provide effective instruction to special needs students.

SYNTHESIS OF STUDY FINDINGS

Analysis of student transcripts reveals that handicapped and academically disadvantaged students, on average, do have access to vocational education in high school. In fact, both groups of students earn considerably more credits, and spend a larger share of their time in high school, in vocational courses than do all nonhandicapped students or academically advantaged students. Additionally, most (82 percent) of the vocational credits earned by handicapped students are in regular vocational courses as opposed to self-contained classes. On average, both handicapped and disadvantaged students earn about the same proportions of their vocational credits as other students in the occupationally specific courses that are thought to provide better preparation for labor force entry than general, exploratory courses.

Significantly, neither handicapped nor disadvantaged students spend much time in training for jobs in low-paying service occupations like janitorial or food services. Only about 13 percent of handicapped students' vocational credits, and 14 percent of disadvantaged students' vocational credits, are in service occupations courses. These proportions compare with 10 percent of the vocational credits earned by all nonhandicapped students and 10 percent of the vocational credits earned by academically advantaged students.

On the other hand, no students spend much time in cooperative education, which has traditionally been acknowledged as the capstone of a high school vocational program that prepares students to enter the labor market, or in paid, competitive work experience, which has been found to be particularly helpful to special needs students in facilitating their transition into the workplace. Handicapped students earn 17 percent of all vocational credits in these courses, compared with 10 percent of the credits earned by nonhandicapped students. Disadvantaged students earn 10 percent of their vocational credits in such courses, while advantaged students earn only 7 percent.

Finally, both handicapped and disadvantaged students earn proportionately more of their vocational credits at area vocational schools, which typically offer a wider range of occupationally specific courses than do comprehensive high schools, than do their nonhandicapped or advantaged peers. Further, the proportion of credits earned at area vocational schools increases as a function of total credits earned in vocational education, with vocational concentrators averaging over five credits in vocational education earning three (in the case of handicapped students) to five (in the case of disadvantaged students) times as many credits at area vocational schools as students who average fewer than 2 credits in vocational courses.

Access to high-quality vocational education remains a serious problem for some handicapped and disadvantaged students, however. Female students do not have equivalent access to specific labor market preparation or area vocational schools. Handicapped females in

particular earn considerably fewer credits in occupationally specific courses than any other group of students. They lack access to business and office occupations, a field that has traditionally attracted mainly female students. Further, these students are disproportionately enrolled in training for service occupations and in consumer and home economics, in comparison with nonhandicapped females and especially in comparison with all male students. The same general patterns hold for disadvantaged females, but the variations are somewhat less pronounced. No female students earn many credits in male-dominated occupations like trades and industry. In general, male handicapped and disadvantaged students' enrollment patterns closely parallel those of their nonhandicapped and academically advantaged peers, a finding that suggests that all in all male special needs students are "better off" in vocational education than are females.

Although less striking than the patterns of female students, access of black handicapped and disadvantaged students to high-quality vocational education is also a problem. Black handicapped and disadvantaged students earn proportionately fewer of their vocational credits in specific labor market preparation than other handicapped or disadvantaged students. They earn proportionally more credits in training for jobs in service occupations. Black handicapped students earn fewer credits overall in vocational courses than handicapped students in other race/ethnic groups, and black disadvantaged students earn fewer than any other group except Hispanic students. (Among nonhandicapped and academically advantaged students, black students earn more vocational credits than any others.)

School characteristics have a considerable effect on disadvantaged students' access to high-quality vocational education. For example, we found major differences in the quality of vocational programs between schools with large and small concentrations of poor and academically disadvantaged students. Students in the most "disadvantaged" group of schools were 40 percent less likely than students in the most advantaged schools to have access to an area vocational school. Schools with the largest concentrations of disadvantaged students

offered 40 percent fewer vocational courses than the most advantaged schools and about one-half as many advanced vocational courses. There were also a third fewer program areas in the most disadvantaged schools compared with the most advantaged schools.

Although their choices are constrained, the graduates of schools with the highest concentrations of disadvantaged students take a much larger proportion of their high school course work in vocational education than do students in schools with the lowest concentrations of disadvantaged students. Students in the most disadvantaged schools take 12.06 credits in academic subjects and 6.49 credits in vocational education (or less than twice as many academic as vocational credits), compared to 16.26 credits in academic subjects and 3.26 credits in vocational subjects in the most advantaged schools (or nearly five times as many academic as vocational credits). This major difference indicates why the quality of vocational education (and its possible academic content) is critical to the quality of overall education for students in disadvantaged schools.

These findings suggest that the greatest needs for program improvement are in schools with the highest concentrations of poor and academically disadvantaged students. Thus, federal policymakers may want to consider provisions that will target federal resources on these schools.

RECOMMENDATIONS

Based on our study's findings, we offer five recommendations for improving the vocational education programs and activities available to handicapped and disadvantaged secondary students who attend comprehensive high schools throughout the nation. This section provides a discussion of these recommendations.[47]

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[47]A series of broad recommendations for improvement in secondary vocational education is presented in Lana Muraskin, *The Implementation of the Carl Perkins Act*, Volume II, Final Report of the National Assessment of Vocational Education (Washington, DC: Department of Education, 1989). We have attempted to avoid duplication in our recommendations; consequently, the reader may wish to review those recommendations along with those presented in this report.

Strategies for Improving Handicapped and Disadvantaged Students' Access to High-Quality Vocational Programs

Our data suggest that problems experienced by female students in gaining access to high-quality vocational programs are exacerbated for handicapped and disadvantaged female students. That is, gender in combination with special needs has more deleterious effects on students' access than either handicapping condition or academic disadvantagement alone. Expansion of female handicapped and disadvantaged students' enrollments in nontraditional programs should be an explicit goal of federally funded school improvement grants targeted on schools with high concentrations of special needs students. Additionally, school performance on this issue should be included in any indicators developed by states for measuring achievement of local vocational education programs in improving the enrollments and outcomes of special needs vocational students.

Strategies for Increasing Special Needs Students' Access to Cooperative Education

Research on the school-to-work transition of handicapped and disadvantaged students has suggested that participation in cooperative education, or at least formal, credit-bearing paid work experience, during high school improves students' likelihood of obtaining competitive jobs after graduation. Our analyses of student transcripts reveals, however, that these programs are not widely available to special needs or other students at the secondary level. Research, possibly in the form of well-designed and rigorously evaluated demonstration projects, is needed to determine the longer term effects of such programs on labor force entry, retention, and advancement.

Implementation of Placement and Follow-Along Services for Handicapped Students

Research findings from the National Longitudinal Study of Handicapped Youth's Transition as well as elsewhere indicate the continuing existence of barriers to labor force entry for handicapped youth as well as for other youth as they exit high school. The emphasis

on expanding placement activities for all students that appears in the NAVE secondary recommendations is particularly critical for handicapped students. Additionally, a major need exists for more accurate and comprehensive information on postschool employment outcomes of these students, which should be a specific focus of any performance indicator systems developed by states for measuring the achievement of local vocational education programs in improving vocational programs for special needs students.

Targeting of Federal and State Resources on Schools With High Concentrations of Special Needs Students

The amount and quality of the vocational programs available to students attending poor (and small) schools is significantly lower than programs available to students attending advantaged (and large) schools. In order to facilitate improvement of the vocational programs available to these students, federal and state vocational funds should be concentrated on schools that contain high concentrations of special needs students.

Access to Area Vocational Schools

Although handicapped and disadvantaged students earn proportionately more of their vocational credits in area vocational schools than do nonhandicapped or academically advantaged students, overall their enrollment in area vocational schools is not high. Since such schools often offer a wider range of occupationally specific vocational programs than do comprehensive high schools, localities should ensure the availability of these programs to all special needs students, particularly to female and minority students, whose enrollment at area schools is considerably lower than that of white handicapped and disadvantaged male students.

APPENDIX A

Confidence Intervals and Differences Between Groups of Students, 1987 High School Transcript Study

Judy Thorne
Westat, Inc.

Confidence Intervals and Differences Between Groups of Students, 1987 High School Transcript Study

The data from the 1987 High School Transcript Study reported in this chapter are weighted estimates of the course-taking behavior and background characteristics of secondary students in the country, based on transcripts from a nationally representative sample of handicapped and nonhandicapped students. Because the data are estimates based on a probability sample, each estimate has associated with it an unknown (but estimated) amount of sampling error, which can be expressed as a confidence interval around each estimate; that is, the distance--to either side of the estimate--within which the "real" number is expected to fall a given percentage of the time.

For example, according to this study, credits in vocational courses represent 26.6 percent of the credits earned by handicapped students in high school; this is an estimate of the "real" amount of vocational course credits. The 95 percent confidence interval around this estimate is expressed as "plus-or-minus 1.2 percent." In other words, we are highly confident that the "real" percentage of vocational course credits is somewhere between 25.4 percent and 27.8 percent.

Student transcript data from HSTS were weighted for the purpose of making estimates of course-taking by secondary school students nationwide. The final weight attached to an individual student record reflected two major aspects of the sample design and the population being surveyed. The first component, the base weight, was used to expand sample results to represent the total population; this component reflected the probability of selection in the sample (the product of the probability of selection of the primary sampling unit, and the school and student within the primary sampling unit). The second component resulted from the adjustment of the base weight to account for nonresponse within the sample and to ensure that the resulting survey estimates of certain characteristics (race/ethnicity, size of community, and region) conformed to those known reliably from external sources.

Estimation of sampling errors was performed by an application of the jackknife procedure. The standard procedure used by Westat is to attach a set of replicate weights (in this case, 36) to each record, one for each replicate. Variance estimation is then performed by repeating the estimation procedure 37 times, once using the original full set of sample weights, and once each for the set of 36 replicate weights. The variability among replicate estimates is then used to derive an approximately unbiased estimate of sampling variance. This procedure was used to obtain sampling errors for a large number of variables for the whole population and for specified subgroups. The sampling variance for the difference in estimates for two subgroups (e.g., a difference between estimates for males and females) was given by the sum of the variances for the two component estimates. Thus, the significance of the difference between the subgroups can be statistically tested.

In the next section we present confidence intervals for several of the estimates in this chapter and tests of significance for differences among estimates. These can be viewed as illustrative of the HSTS data discussed in the chapter.

Illustrative Confidence Intervals and Tests of Significance

Table A.1 presents each of the estimates given in table 2.4 of this report, along with the 95 percent confidence interval around each estimate.

Many of the tables in this chapter present analyses that contrast handicapped and nonhandicapped students. As an illustration, we have tested the statistical significance of the differences between handicapped and nonhandicapped students shown in table 2.9 (table A.2). As indicated below, in each of the three cases (course locations), the difference is significant at a probability level less than .05.

Table A.3 presents differences between average credits earned by handicapped and nonhandicapped students in types of work-based courses. The table shows that in each case, the average credits earned by the two groups are significantly different at a probability level less than .05.

Table A.1

Enrollment of Handicapped High School Students in Mainstream Courses, as a Percentage of Credits Earned With Confidence Intervals Indicated for Students in 11th Grade at Selection

Course	Academic Percentage	C.I.[a/]	Vocational Percentage	C.I.[a/]	Personal/ Other Percentage	C.I.[a/]	All Courses Percentage	C.I.[a/]
Mainstream	59.6	(±2.6)	81.7	(±3.1)	75.1	(±3.9)	67.9	(±1.5)
Special education	40.4	(±2.6)	18.3	(±3.1)	24.9	(±3.9)	32.1	(±1.5)
Percentage of all courses	58.0	(±0.9)	26.6	(±2.1)	15.4	(±1.1)	-	-

SOURCE: 1987 High School Transcript Study.

a/ 95 percent Confidence Interval.

Table A.2

Location of Students' Vocational Courses, as a Percentage of all Credits Earned in Vocational Education (Differences Between Handicapped and Nonhandicapped Students Indicated) (Students in 11th Grade at Selection)

Students	Percentage of All Vocational Education at Home High School	Area Vocational School	All Other Locations
Handicapped	62.48	16.00	21.52
Nonhandicapped	84.32	8.79	6.89
Difference	-21.84[a/]	7.21[a/]	14.36[a/]

SOURCE: 1987 High School Transcript Study.

a/ The difference between handicapped and nonhandicapped students is significant at the p <.05 level.

Table A.3

Average Credits Earned by Handicapped and Nonhandicapped Students in Work-Based Courses, Differences Between Groups Indicated, Students in 11th Grade at Selection of Sample

Type of Course	Handicapped Students	Nonhandicapped Students	Difference[a/]
Cooperative education	0.12	0.17	-0.05
Paid work experience	0.28	0.09	0.19
Unpaid work-study	0.47	0.13	0.34
Total	0.87	0.39	0.48

SOURCE: 1987 High School Transcript Study.

a/ The difference between average credits earned by handicapped and nonhandicapped students is significant at the $p < .05$ level.

APPENDIX B

Taxonomy of Service Occupations

Taxonomy of Service Occupations

One continuing concern of educators and researchers about the quality of the vocational programs to which handicapped and disadvantaged students have access at the high school level is whether these students are relegated to training in occupational fields that promise little economic return. Of particular concern is whether these students are trained for jobs in janitorial, food, and custodial services. In order to investigate this issue using information on course enrollments from student transcripts, we developed a taxonomy of service occupations, most of which could be expected to offer little long-term economic payoff in terms of earnings or career advancement. This appendix provides a brief overview of the methods used in developing the service occupations taxonomy.

To develop a working definition of service occupations for use in classifying vocational education CSSC codes, we consulted with a staff specialist in the Division of Occupational Statistics for Service Sectors at the U.S. Department of Labor (DOL). This specialist provided resource materials used by the Bureau of Labor Statistics and the Census Bureau in defining service occupations, including the Service Occupations sections of DOL's *Standard Occupational Classification Manual* and *Occupational Classification System*. These documents supplemented information in the *Dictionary of Occupational Titles*. Following its development, DOL's staff specialist for service occupations reviewed it for accuracy.

For purposes of this report, the category of Service Occupations include:

> Occupations concerned with providing domestic services in commercial, institutional, or other establishments; providing lodging and related services; providing grooming, cosmetic, and other personal and health care services for children and adults; maintaining and cleaning clothing and other wearing apparel; providing protection for people and property; attending to the comfort or requests of patrons of amusement and recreation facilities; and performing cleaning and maintenance services to interiors of buildings.[48]

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[48] *Dictionary of Occupational Titles*, 4th edition (Washington, DC: U.S. Department of Labor, 1977).

The following provides a brief description for each of the categories of service occupations used in the taxonomy:

Amusement and recreation: includes occupations concerned with amusement and recreation services (e.g., drive-in theater attendant, animal-ride attendant).

Apparel and furnishings: includes occupations concerned with improving the appearance of and repairing clothing, furnishings, and accessories.

Barbering, cosmetology, and related: includes occuaptions concerned with rendering beauty and/or related treatments to individuals.

Building and related: includes occupations concerned with the cleaning and upkeep of building interiors and the conveying of passengers and freight by elevator.

Food preparation: includes occupations concerned with preparing food and beverages and serving them to patrons of such establishments as hotels, clubs, restaurants, and cocktail lounges.

Health and related: includes occupations concerned with attending to the physical comfort, safety, and appearance of patients; performing routine menial tasks; and assisting in conducting occupational and physical therapy.

Lodging and related: includes occupations concerned with providing accommodations to persons in boarding houses or lodging houses, hotels, trailer parks, apartments, and other locations.

Personal services: includes occupations concerned with duties performed by stewards and hostesses, not elsewhere classified, and attendants, guides, and the like.

Private household: includes occupations concerned with tasks in and around a private household.

Protectice services: includes occupations concerned with protecting the public against crime, fire, accidents, and acts of war.

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